VOLUME 30 JANUARY 1937 NUMBER 1

Southern Medical Journal

Journal of the Southern Medical Association

Copyright, Southern Medical Association, 1936. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription, $4.00. Entered as Second-Class Matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30-December 1-2-3, 1937

TABLE OF CONTENTS

Picture of Dr. Frank K. Boiand, President, Southern Medical Association Insert

The Heart in Endemic Pellagra. William B. Porter and Upshur Higginbotham, Richmond, Virginia 1

A Clinical Evaluation of the Potency of Various Extracts of Liver in the Treatment of Pellagra. Julian M. Ruffin and David T. Smith, Durham, North Carolina 4

Some Factors in the Etiology of Pellagra. V. P. Sydenstricker and J. W. Thomas, Augusta, Georgia 14

Discussed by Leon S. Lippincott, Vicksburg, Miss.

Treatment of Endemic Pellagra. Tom Douglas Spies, Cincinnati, Ohio, Austin Chinn, Washington, District of Columbia, and James B. McLester, Birmingham, Alabama 18

Discussed by James E. Paullin, Atlanta, Ga.; W. H. Sebrell, Washington, D. C.

Prefrontal Lobotomy in the Treatment of Mental Disorders. Walter Freeman and James W. Watts, Washington, District of Columbia 23

Discussed by Adolf Meyer, Baltimore, Md.; Walter J. Otis, New Orleans, La.

The Treatment of Angiomata with Radium. William S. Newcomet, Philadelphia, Pennsylvania 32

Concluded on Next Page

AN AMERICAN DOCTOR'S ODYSSEY

Adventures in 45 Countries

By VICTOR HEISER, M. D.

Here is the remarkable personal story of a distinguished American doctor who for more than thirty years has travelled about the world, his life dedicated to a single idea—the application of knowledge to the prevention of disease. Kings and tribal chiefs, soldiers and head hunters, physicians and witch doctors, millionaires and the humblest of aborigines have been his friends. Backed by the great Rockefeller Foundation he has probably inaugurated more movements to save and prolong human life than any other living person. The story of his wanderings, which he now sets down in graphic and absorbing detail, his publishers offer as one of the most exciting, completely human, and wholly delightful records of an adventurous life that has appeared in many seasons. Now top on the national best seller list with 141st thousand on press. Price $3.50

SEND ORDERS TO

NEW ORLEANS J. A. MAJORS COMPANY DALLAS

TABLE OF CONTENTS—Continued

The Ophthalmoscopical Differentiation Between Papilledema and Papillitis. Arthur J. Bedell, Albany, New York 37

Benign Lesions of the Breast Diagnosed and Treated as Carcinoma. David R. Murphey, Jr., Tampa, Florida 44

Discussed by Dean Lewis, Baltimore, Md.; George A. Stewart, Baltimore, Md.

Sarcoma of the Gallbladder: Report of a Case. Lucien Y. Dyrenforth and Edward Jelks, Jacksonville, Florida 49

Neoplasms of the Digestive Tract. Thomas R. Brown, Baltimore, Maryland 52

Modern Management of Accessible Malignant Disease. Grant E. Ward, Baltimore, Maryland 55

The Curve of Phenolsulphonphthalein Elimination in Unilateral Kidney Disease. E. Clay Shaw and Jack A. McKenzie, Miami, Florida 61

Discussed by A. J. Crowell, Charlotte, N. C.; Edwin P. Alvea, Durham, N. C.

Normal Physiologic Douches. Karl John Karnaky, Houston, Texas 69

The Frontiers of Orthopedic Surgery. Robert W. Johnson, Jr., Baltimore, Maryland 70

Experiences with Liberal Carbohydrate Diets in Diabetic Children. Hugh L. Dwyer, Kansas City, Missouri 74

Discussed by T. Cook Smith, Louisville, Ky.; C. M. Burpee, Augusta, Ga.

The Epidemiologic Aspects of Syphilis Control. W. A. Brumfield, Jr., Albany, New York 82

Discussed by Ferdinand O. Reinhard, Baltimore, Md.

The Number and Distribution of Physicians in the Southern States as Bearing upon the Policies of Southern Medical Colleges. O. W. Hyman, Memphis, Tennessee 85

Discussed by C. C. Bass, New Orleans, La.; W. T. Sanger, Richmond, Va.

Management of Psychoneurotic Patients. Lewellys F. Barker, Baltimore, Maryland 89

Anuria of Thirteen Days: Case Report. Rudolph Bell, Thomasville, Georgia 92

Obstruction of the Small Intestine by Enterolith: Recovery Following Removal. Francis J. Scully and Jack S. Stell, Hot Springs National Park, Arkansas 93

The Chemical Transmission of Nerve Impulses in the Autonomic Nervous System. Eugene L. Jackson, Emory University, Georgia 94

EDITORIALS 99

Frank Kells Boland, President of the Southern Medical Association

Liver Extracts

Gleanings from Recent Journals

Twenty-Five Years Ago

CORRESPONDENCE 102

Acids in Treatment of Vulvo-Vaginitis in Children. Karl John Karnaky, Houston, Texas.

BOOK REVIEWS 103 and 131

OFFICERS, Southern Medical Association and organizations meeting conjointly 104

MINUTES, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936 105

SOUTHERN MEDICAL NEWS 132

The University of Georgia School of Medicine

AUGUSTA, GEORGIA

OFFERS A POST-GRADUATE COURSE

MARCH 1-5 Inclusive

A—Sex Endocrinology and Pathology

By Prof. Walter Schiller of Vienna, Austria.

B—Diagnosis and Treatment of the Newer Venereal Diseases—Chancroid, Granuloma Inguinale and Lymphopathia Venerea

By members of the faculty.

FEE $20.00

FOR INFORMATION APPLY TO DEAN

LIPPINCOTT BOOKS

EMERSON

TEXTBOOK OF MEDICINE

By Charles P. Emerson, M.D.

Research Professor of Medicine, Indiana University School of Medicine, Indianapolis

Octavo. 1296 Pages. Cloth, $8.00

This textbook on internal medicine portrays vividly the syndromes which diseases present. The contributions of the preclinical signs are presented in smaller type and footnotes so as not to blur the clinical pictures.

While the pathogenic microorganisms which induce disease have received due attention, the personality of the patient, his history, his family, his environment, all important factors in the etiology and cares of his maladies, are stressed.

Written by an internist of vast experience, it covers specific infectious diseases. Diseases due to physical agents; drugs and poisons; serum disease; allergic reactions; diseases of metabolism; deficiency diseases; diseases of the ductless glands; blood-building organs; respiration; lungs; circulatory system; gastro-intestinal canal; peritoneum and mesentery; pancreas; liver; gallbladder and bile passages; kidneys and bladder; bones, joints and muscles; nervous system; brain; cerebral nerves; cord; peripheral nerves; psychoneurotic disorders.

Intended as a handbook of daily use in the practice of medicine and as a textbook for students.

J. B. LIPPINCOTT COMPANY

LONDON *Since 1875* 16 John St., Adelphi
PHILADELPHIA *Since 1792* East Washington Square
MONTREAL *Since 1879* Confederation Bldg.

PLEASE SEND ME:

☐ Emerson-Text. of Medicine.....$8.00

Name.....

Address.....

Town.....State.....

SOUTHERN MEDICAL JOURNAL.

An Accepted, Highly Effective Milk Modifier . . . at an Approximate Cost of 2¢

PER DAY

On the basis of tested and approved feeding schedules averaged for babies up to the age of nine months, one tablespoon of Karo would be used with about 6 fluid ounces of milk. On this basis, a one and one-half pound tin of Karo (which sells in grocery stores for about 12c) will furnish the necessary amounts of easily assimilated carbohydrates, dextrin, maltose and dextrose, for 6 quarts of whole milk. Probably no other infant food of equal acceptance is available at such low cost as Karo.

Mothers, generally, will appreciate their doctors' suggestion of Karo as an effective, economical milk modifier.

Karo is accepted by the Council on Foods of the American Medical Association.

★ **Infant feeding practice is primarily the concern of the physician, therefore, Karo, for infant feeding, is advertised to the Medical Profession exclusively.**

For further information, write
CORN PRODUCTS SALES COMPANY, 17 Battery Place, New York, N. Y.

New MOSBY Books!

● MANAGEMENT OF OBSTETRIC DIFFICULTIES

This brand new book is a practical aid to all physicians who are meeting and contending with obstetric difficulties and emergencies. Obstetric work is peculiar in two respects; its difficulties are largely preventable, but its emergencies must be promptly met. This requires early recognition of impending trouble, and obstetric experience. The chief purpose of this book is to provide swiftly available information to supplement one's judgment respecting the proper management of such emergencies.

This is not a conventional textbook. Such fundamentals as obstetric physiology, normal pregnancy, normal labor, and the uncomplicated puerperium with kindred subjects, have been omitted. It does, however, include all the essential information regarding obstetric emergencies, abnormalities and difficulties.

Contents: Section 1 —Sterility. 61 pages.
Section II —Difficulties in Diagnosis of Pregnancy. 29 pages.
Section III —Complications of Pregnancy. 284 pages.
Section IV —Complications of Labor. 150 pages.
Section V —Obstetric Operations. 150 pages.
Section VI —Complications of the Puerperium. 76 pages.
Section VII —The Newborn Infant. 17 pages.
Section VIII —General. 68 pages.

By PAUL TITUS, Obstetrician and Gynecologist to St. Margaret Memorial Hospital, Pittsburgh. 870 pages, 314 illustrations. Price, $8.50.

Physical Therapeutic Methods In Otolaryngology

Comprehensive in scope and especially detailed in technic, this work should prove of inestimable value to the otolaryngologist. The general practitioner and the technician also should find this book of material help in treating ear, nose, and throat conditions with physical measures.

The basic chapters dealing with photothermy, low voltage currents, phototherapy, long and short wave diathermy, x-rays and radium are up to the minute in information, highly authoritative and concisely written especially for the otolaryngologist.

The otolaryngologist can no longer fail to recognize the rationale of physical procedures as aids to accepted methods of treatment. Only such technics are discussed as have been shown definitely to possess merit.

By ABRAHAM R. HOLLENDER, M.D., F.A.C.S., Associate in Laryngology, Rhinology and Otology, University of Illinois, College of Medicine. 422 pages, 189 illustrations. Price, $5.00.

SYNOPSIS VOLUMES

Synopsis of Ano-rectal Diseases

This work goes into detail especially in the technic of methods of diagnosis and details of treatment which can be administered without the use of general anesthesia. Many methods of office treatment are described and clearly illustrated. Care has been taken to present methods of treatment which do not require complicated or expensive electrical or other apparatus. It does not attempt to treat of the major diseases of the rectum or of the colon but is designedly limited to the treatment of the commoner diseases of the anus, anal canal and the rectum. The diagnosis, however, of major conditions such as carcinoma are included of necessity in order to avoid pitfalls for the unwary.

By LOUIS J. HIRSCHMAN, M.D., F.A.C.S., Professor of Proctology, Medical Department, Wayne University. 288 pages, 174 illustrations. Price, $3.50.

Synopsis of Heart Diseases

Provides an acceptable indexed epitome of the principles and modern conceptions of cardiologic practice. For the physician harassed in the caring for a general practice, it is hoped this book will render a real service. Material has been freely drawn from all the standard works where references may be found, as well as from the literature. Illustrations have been used wherever they help to visualize and assist in making clear the message conveyed in the text.

By GEORGE R. HERRMANN, M.D., Ph.D., Professor of Clinical Medicine, University of Texas. 344 pages, 88 illustrations, 3 color plates. Price, $4.00.

Synopsis of Clinical Laboratory Methods

The objective of this synopsis is to bring together in a small volume for ready reference the more recent information and the most frequently used methods of laboratory diagnosis. The selection and arrangement of the material is such as to aid the general practitioner in solving the everyday problems that arise in routine laboratory work.

By W. E. BRAY, B.A., M.D., Professor of Clinical Pathology, University of Virginia. 324 pages, 32 illustrations, 11 color plates. Price, $3.75.

● PRACTICE OF MEDICINE

Styled to meet the modern trend and thorough in its coverage this book will broaden your knowledge and technic of the best approved methods for handling the sick. Meakins' book approaches the subject from a physiological and biochemical standpoint rather than from a pathologic and anatomical one. The latter, however, is not neglected. The advances made in recent years toward combating diseases are fully recorded in this book. The smooth flowing style of the author, his tendency to talk "down to you," not over your head, is especially refreshing. Pictures are an important part of this book, making this volume not only a guide to the practice of medicine, but a description of individual cases.

By JONATHAN CAMPBELL MEAKINS, M.D., LL.D., Professor of Medicine, and Director of the Department of Medicine, McGill University. 1343 pages, 505 illustrations, 35 in colors. Price, $10.00.

● THEORY AND PRACTICE OF PSYCHIATRY

This book deals with pre-institutional psychoses, cases met in general practice and in the mental hygiene clinics as well as by the psychiatrist. It brings together a treatise not too technical in its presentation which covers the whole field of psychopathology and mental hygiene.

By WILLIAM S. SADLER, M.D., Chief Psychiatrist and Director, The Chicago Institute of Research and Diagnosis. 1231 pages. Price, $10.00.

● ALLERGY OF THE NOSE AND PARANASAL SINUSES

It is important to know that of all the manifestations of allergy, the most common are those confined to the nose and paranasal sinuses. From the standpoint of diagnosis the nasal form of allergy occupies the key position. This book, therefore, is just as important and valuable to the internist and pediatrician as it is to the eye, ear, nose and throat man. It deals not only with the allergic phases of nasal and paranasal sinuses, but also with the various factors concerned in sinus infection.

By FRENCH K. HANSEL, M.D., M.S., Assistant Professor of Clinical Otolaryngology, Washington University School of Medicine, St. Louis. 820 pages, 58 illustrations, 3 color plates. Price, $10.00.

THE C. V. MOSBY COMPANY SMJ-1-37
3525 Pine Blvd., St. Louis, Mo.
Gentlemen: Send me the following books.....
.....
charging my account.
Dr. .....
Address .....

Hexylresorcinol Solution S. T. 37

IN the treatment of infections of the upper respiratory tract, so frequent at this season of the year, the clinician desires an efficient antiseptic which is non-irritating and non-toxic. Hexylresorcinol Solution meets these requirements and possesses the additional advantages of being odorless, colorless and stainless, and of having low surface tension.

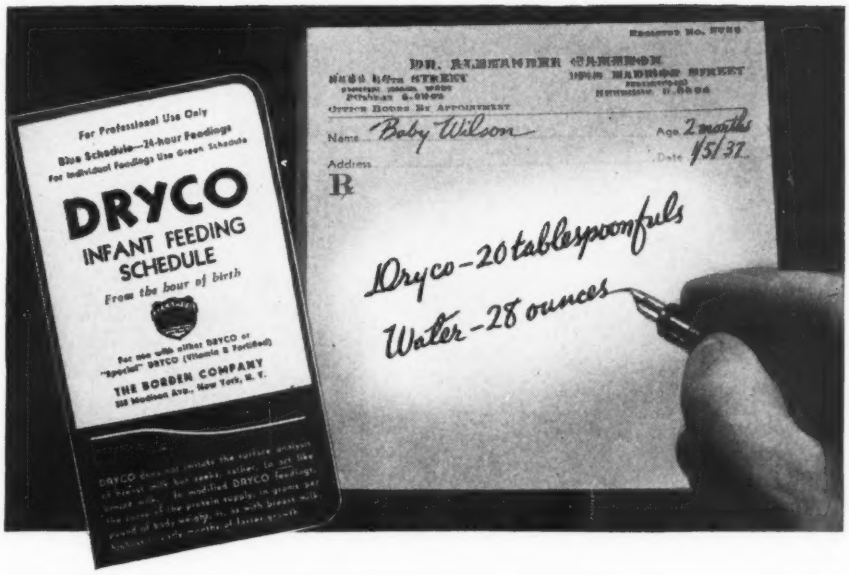
Application of Hexylresorcinol Solution to various tissues of the nasopharynx may be topically, by use of nasal tampons, or by spray or irrigation. A dilution of one part Hexylresorcinol Solution with two to four parts warm water is suggested for irrigations and for nasal tampons. Application topically or by spray may be made full-strength or in dilution. Where it is desired to apply an antiseptic to the pharynx, larynx and trachea, the use of a spray of Hexylresorcinol Solution is especially indicated.

Hexylresorcinol Solution [1:1000 Solution of Caprokol (Hexylresorcinol, S&D)] is supplied in convenient five-ounce and twelve-ounce bottles.

"For the Conservation of Life"

Pharmaceuticals SHARP & DOHME *Mulford Biologicals*

PHILADELPHIA BALTIMORE MONTREAL



Almost a whole FEEDING MANUAL in 4 pages—

Here are specific formulas for:

THE NEWBORN FROM BIRTH

A non-allergic, energy-providing feeding procedure for your newborn cases, particularly when breast nursing is expected. Clinically proved and widely adopted.

THE NORMAL, WELL BABY

A simple, yet remarkably successful feeding schedule, based on a principle of nutrition only recently recognized in artificial feeding tables. DRYCO'S greater digestibility permits feedings that provide *highest protein values during the early months of fastest growth.*

THE PARTIALLY BREAST-FED

When the breast flow is inadequate, this easily prescribed, more truly complementary formula is less apt to force premature weaning.

THE DIFFICULT FEEDING CASE

When other foods or formulas have failed—a *separate* feeding table for the problem case, the malnourished or the convalescent infant—backed by 20 years of clinical success.

Designed for use with either DRYCO or "Special" DRYCO (Vitamin B Fortified). Copies, for professional use only, will gladly be mailed upon receipt of coupon.

DRYCO

Made from superior quality milk from which part of the butterfat has been removed, irradiated by the ultra-violet ray, under license by the Wisconsin Alumni Research Foundation under the Steenbock patent (U. S. Pat. No. 1,608,818) and the Supplee process patent (U. S. Pat. No. 1,817,935), and dried by the "Just" Roller Process.

THE BORDEN COMPANY,
Prescription Products Dept., Dept. Y-17-D
350 Madison Avenue, New York, N. Y.

Please send copies of the DRYCO Infant Feeding Schedule.

Name_____ M. D.

Street_____

City_____ State_____

Check here for samples of DRYCO ☐ Special DRYCO ☐

Ephedrine Inhalants, Lilly

● Bland, yet markedly decongestive, Lilly Ephedrine Inhalants give immediate relief in head colds and many other nasal conditions accompanied by swelling of the mucous membranes, closure of sinus openings, and excessive secretion.

An inhalant is available with camphor, menthol, and oil of thyme, *Inhalant Ephedrine Compound, Lilly;* and without the aromatics, *Inhalant Ephedrine (Plain), Lilly.*

ELI LILLY AND COMPANY

Principal Offices and Laboratories, Indianapolis, Indiana, U. S. A.

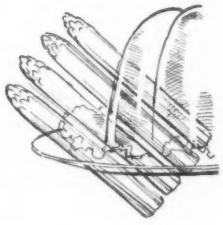
Diabetic Diets Easily Planned with KNOX GELATINE

Gelatine (U.S.P.) plays an important role in diabetic diets. With a limited assortment of foods that are included in the diet, gelatine will "dress-up" these same required foods into attractive salads and desserts.

It is easy to calculate a diet with gelatine dishes because Knox Gelatine is of known caloric value, being a pure, but incomplete, protein.

Knox Gelatine should not be confused with an already prepared jelly powder which contains sugar, flavoring and gelatine.

Knox Gelatine is scientifically made from selected long, hard, shank beef bones—surpasses minimum U.S.P. requirements—pH about 6.0—contains no carbohydrates—fat content less than 0.1%—odorless—tasteless—bacteriologically safe.



SPANISH CREAM for Diabetics

	Grams	Prot.	Fat	Carb.	Cal.
1 envelope Knox Sparkling Gelatine	7	6			
¼ cup cold water					
1 cup milk	240	7	10	12	
¾ cup boiling water					
2 eggs	100	13	10		
1½ teaspoonfuls vanilla					
¼ teaspoonful salt					
(Six servings) TOTAL		26	20	12	330
ONE SERVING		4	3	2	55

Heat water and milk over boiling water. Pour cold water in bowl and sprinkle gelatine on top of water. Add to hot milk mixture and stir until dissolved. Separate eggs and beat yolks until lemon colored. Stir gelatine mixture slowly into egg yolks. Return to stove and cook over boiling water until mixture begins to thicken. Remove from stove, add vanilla and salt and chill. In the meantime, beat egg whites until stiff. Fold into congealing jelly. Mold and chill until firm.

KNOX SPARKLING GELATINE

KNOX GELATINE LABORATORIES
408 Knox Avenue, Johnstown, N. Y.

Please send me diet prescription pads—also infant feeding literature.

Name.....

Address.....

City.....State.....

WHY UROLOGISTS PRESCRIBE TRADE PYRIDIUM MARK

SATISFACTORY
CLINICAL RESULTS

•

PROMPT
SYMPTOMATIC RELIEF

•

CONVENIENCE
OF ADMINISTRATION

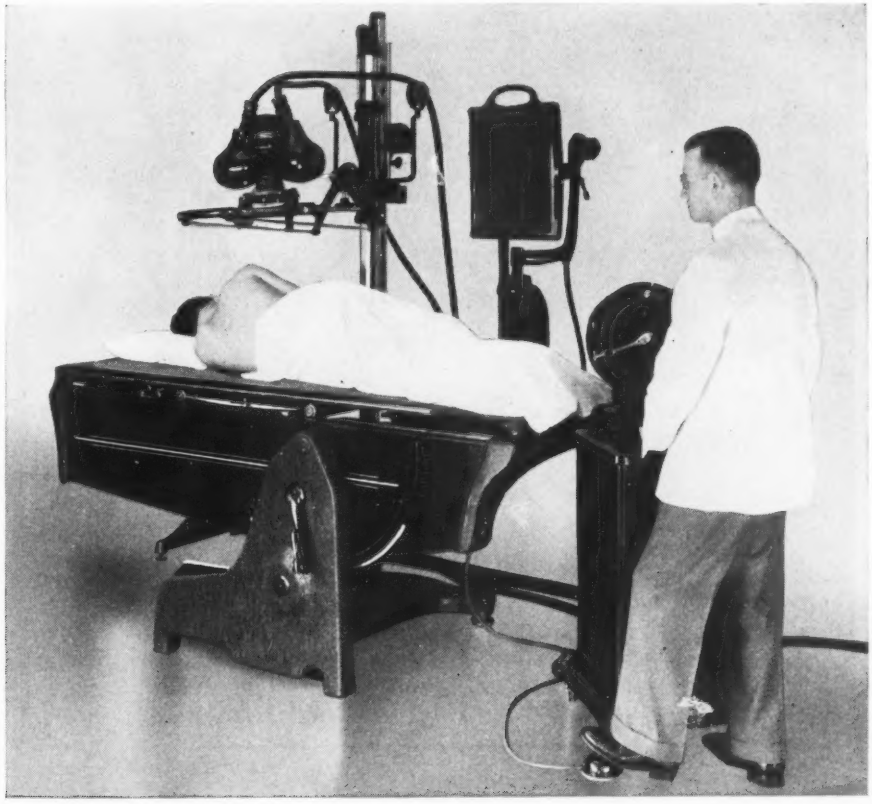
•

EFFECTIVENESS
IN ACID OR
ALKALINE URINE

"While our results with the use of Pyridium in renal infections have been most satisfactory, it is our opinion that the most spectacular results have been in the chronic infections of the bladder and the male genital organs."

—Quoted from Published Clinical Reports

MERCK & CO. INC. *Manufacturing Chemists* RAHWAY, N. J.



The New Major Calibre X-Ray Unit at a Moderate Price

THE NEW G-E Model R-36 is beyond question the most unusual investment opportunity ever presented in a diagnostic x-ray unit. When compared with other equipment of corresponding capacity and range, it merits a place in the high priced group.

But the R-36 was, from its inception, intended to sell at a moderate price, without sacrificing G-E quality. Standardization of unit design and modern manufacturing facilities have effected economies of direct benefit to every purchaser. The result is a major calibre apparatus at a price within the means of virtually every individual or institution having need for an x-ray unit of this type and range.

Here you find ample power for fractional-second chest radiography at a 72-inch patient-film distance. One Coolidge tube suffices for a complete radiographic range, because it has two focal spots which can be used selectively. For fluoroscopy, a separate oil-immersed high voltage transformer and tube are used, but operated through the same control stand.

Completely oil-immersed and shockproof, the R-36's operation is independent of humidity, dust, moisture, and altitude. Its radically improved system of controls is so simple, convenient, and positive, that routine production of a distinctly high quality of radiographic work is assured.

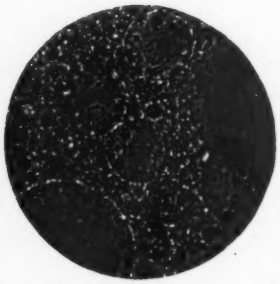
If you contemplate a strictly modernized x-ray diagnostic service of a high order, don't fail to investigate the possibilities with Model R-36 ... Address Dept. A31 for Catalog 7A-201, just off the press.

GENERAL ELECTRIC X-RAY CORPORATION

2012 JACKSON BLVD. CHICAGO, ILLINOIS

Emulsification AIDS *Utilization*

Photomicrograph of MALTINE WITH COD LIVER OIL,★ *enlarged 400 times.*



Photomicrograph of another typical malt and cod liver oil compound, enlarged 400 times.

IT IS COMMONLY believed that emulsification affects utilization. The minute emulsification of Maltine and cod liver oil, made possible by the exclusive Maltine process, is believed to be largely responsible for the thorough utilization of food values contained in MALTINE WITH COD LIVER OIL. In fact, laboratory tests on animals indicate that the vitamin A value of cod liver oil is enhanced *twofold* when emulsified in Maltine, as in MALTINE WITH COD LIVER OIL. A microscopic study of MALTINE WITH COD LIVER OIL reveals exceptionally small globules of uniform size and distribution, whereas the same study of other widely marketed products shows bulky globules of uneven size and distribution. MALTINE WITH COD LIVER OIL is made entirely in the Maltine laboratories with specially designed vacuum equipment.

MALTINE WITH COD LIVER OIL is guaranteed to contain vitamins A, B, D and G. Does not contain molasses or added syrups. The Maltine Co., 60 Hudson St., New York.

STANDARD SIZE CONTAINS 18 FLUID OUNCES

ACCEPTED AMERICAN MEDICAL ASSN

GENUINE

Maltine

Trade-Mark Reg. U. S. Pat. Off.

WITH COD LIVER OIL

★*Maltine 70%, cod liver oil 30%*

DISCIPLINE

"Discipline is the development of the faculties by instruction and exercise." When functions such as habit time of bowel movement are neglected through lack of discipline or intelligence, they require careful training to restore them to a normal state.

Petrolagar has proved to be an agreeable and effective means of assisting in the establishment of bowel discipline. Because Petrolagar mixes intimately with the bowel contents, it increases the bulk in the stool to a soft mass which is easily passed.

Petrolagar is prepared in five types — providing the doctor with a variation of treatment to suit the individual patient. Petrolagar Laboratories, Inc., Chicago, Ill.

Petrolagar is a mechanical emulsion of pure liquid petrolatum (65% by volume) and agar-agar. Accepted by the Council on Pharmacy and Chemistry of the American Medical Association for the treatment of constipation.

Petrolagar

IN COUGHS..HELP MAINTAIN THE

Wyeth's

CITRI-CEROSE

The citrate content of Citri-Cerose supplements the normal intake of alkalizing substances, helping to re-establish alkali reserves depleted by infection.

Citri-Cerose provides quick relief for coughs, is safe and effective and is unusually palatable and well tolerated.

It does not contain sugar and is especially suitable for children. Citri-Cerose does not disturb digestion.

EACH FLUID OUNCE CONTAINS

Codeine Phosphate	0.5 gr.
Chloroform	2.5 mins.
F. E. Ipecac	1.0 min.
F. E. Wild Cherry	4.0 mins.
Citric Acid	6.0 grs.
Sodium Citrate	18.0 grs.
Potassium Guaiacol Sulfonate	8.0 grs.
Menthol	3/40 grs.

CONTAINS NO SUGAR

Relieves the spasms of harsh or irritating coughs
Loosens and liquefies bronchial secretions
Promotes diuresis and diaphoresis
Promotes ready expectoration

Your prescription pharmacy has Citri-Cerose in pints and gallons

CLINICAL PACKAGES AVAILABLE ON REQUEST

JOHN WYETH & BROTHER, Inc. PHILADELPHIA, PA. WALKERVILLE, ONT.

Pneumonia is an emergency!

ANTIPNEUMOCOCCIC SERA
Lederle

THESE are essential facts in the serum treatment of pneumonia—

Serum must be specific for the type of pneumococcus causing the infection.

The earlier the serum is used, the lower the death rate.

Serum treatment should be both *prompt* and *intensive*. The dosages recommended are intended to be administered within a 12-24 hour period. Antipneumococcic serum therapy is less effective when the basic dosage is spread over several days.

The death rate rises rapidly with the lapse of time from the onset of the disease to the beginning of adequate serum therapy, and the amount of serum necessary for adequate treatment increases as the disease progresses.

Cecil* has combined the reports of several authors, which demonstrate the importance of early administration:—

Type	First 4 Days		After the Fourth Day		Controls (all days)	
	Cases	Mort. %	Cases	Mort. %	Cases	Mort. %
I	744	9.6	641	23.6	565	33.6
II	362	29.6	155	38.7	516	45.3

After the fifth day in the non-bacteremic cases and the fourth day in bacteremic cases, enormous amounts of serum are needed—and the prognosis may be poor. Early and adequate therapy saves lives—and serum.

*Dr. Russell Cecil, N. Y. S. Jour. of Medicine, Vol. 35, Nov. 15, 1935, No. 22, p. 7.

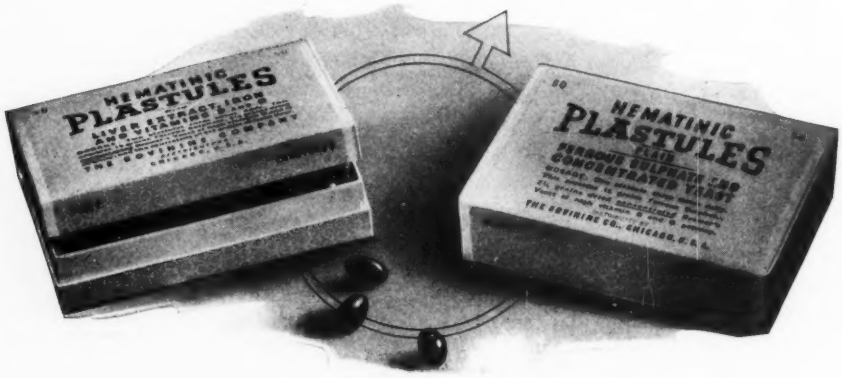
Bivalent and Monovalent Antipneumococcic Sera Lederle for Types I and II are supplied in syringes of 10,000 and 20,000 units.

LEDERLE LABORATORIES, INC.
30 ROCKEFELLER PLAZA NEW YORK, N.Y.

IRON

THE therapeutic value of iron is directly proportional to the ease with which ferrous ions are liberated. Recent experiments have shown the ferrous salts to be the most effective in the treatment of anemias because they are more rapidly assimilated, require smaller doses and are more economical than other forms of iron now in use. An effective form of ferrous iron is available in Hematinic Plastules. . . . Actual tests reveal that the absorption of ferrous sulphate in Hematinic Plastules is four to five times greater than that of ferric ammonium citrate, 15 times greater than that of reduced iron, and is more readily adaptable to metabolism in the human body. Three Hematinic Plastules Plain provide the average patient with an adequate daily dose of iron to show a marked increase in hemoglobin. . . . Hematinic Plastules provide ferrous sulphate and vitamins B and G in an edible oil in the form of a semi-fluid mass, enclosed in soluble gelatin capsules which quickly dissolve in the stomach. . . . Hematinic Plastules are available in two types—Plain and with Liver Extract.

Send for Samples and Literature



THE BOVININE COMPANY • CHICAGO, ILLINOIS

NEEDS A BLAND, NON-IRRITATING NORMAL STIMULANT

The Problem—The objective of treatment in this prevalent condition should, of course, be the *restoration of normal peristalsis.*

Previous Failures—Clinical experience shows that normal bowel function cannot be obtained by the use of irritating cathartics, dehydrating salines, brans and other crude roughage, demineralizing oily emulsions.

Corrective Therapy—By contrast the new development—Mucilose—a specially prepared hemicellulose obtained from the plantago loeflingii—does not irritate, does not stimulate gastric secretory function but acts correctively, naturally, to secure normal bowel rhythm.

MUCILOSE

(STEARNS)

Supplies bland, non-irritating distention, lubricates without leakage, produces large, formed, soft stools, is easy to take, economical.

Mucilose is regulative to the spastic colon.

●

FREDERICK STEARNS & COMPANY

Detroit New York Kansas City San Francisco

Windsor, Ontario Sydney, Australia

FREDERICK STEARNS & COMPANY
Detroit, Mich. Dept. S.M.1

Please send me a supply of Mucilose for clinical test.

Dr. _____

Address _____

City _____ State _____

Readily ASSIMILABLE FAT -- an essential in FEEDING THE PREMATURE

IN a recent study of fat metabolism in infants, Holt, Tidwell and Kirk* report that olive oil showed the highest percent retention (95.1%) of all fats studied but one, olein (97.5%). These authors found the fat of SIMILAC (which is 20% olive oil) showed a better percent retention (92.6%) than butter fat (88.9%)—and as high a retention as breast milk fat (92.4%).

To quote these authors—"the differences in fat retention on these various fats as shown on normal infants are not great; for the normal infant it is probably immaterial whether he absorbs 85% or 95% of his fat intake. It seemed possible, however, that *in subjects who have difficulty in fat assimilation, such as premature infants, the observed small differences might become large differences. A few observations made on premature infants and twins have borne this out—.*"

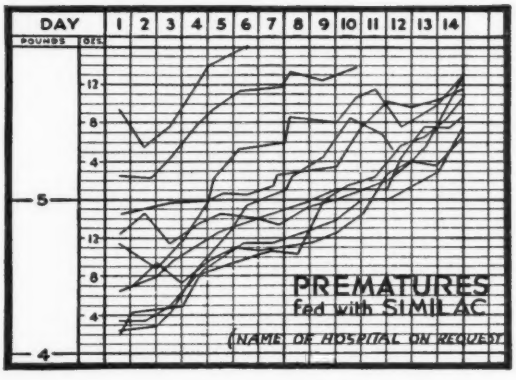
The observations referred to covered only three prematures fed on different fats, but showed an average of 78.4% retention for olive oil as compared to only 52.5% retention for butter fat.

*Holt, Tidwell and Kirk, Studies on Fat Metabolism in Infants—Acta Pediatrica, Vol. XVI, 1933.

SIMILAC

has given noticeably good results in feeding the premature infant. One of the reasons lies, as here pointed out, in the composition of its fat. Another reason is its consistently zero curd tension. The finer the curd the greater the surface area. The greater the surface area the more exposed are the fats, carbohydrates, proteins and salts to the digestive enzymes. Result . . . the food substances are more quickly and readily utilized.

SIMILAC is made from fresh skim milk (casein modified) with added lactose, salts, milk fat, and vegetable and cod liver oils.



The fact that SIMILAC is well assimilated by the immature digestive tract of the premature indicates how entirely suitable it is for all those infants who are deprived of breast milk.

M & R DIETETIC LABORATORIES, Inc., Columbus, Ohio

THE *hydrogen ion* IN GENITO-URINARY INFECTIONS

•

THE TREATMENT of genito-urinary infections with Serenium—an orally administered antiseptic dye—is frequently enhanced by adjusting the hydrogen-ion concentration of the urine within a certain range of acidity or alkalinity.

For the purpose of determining the pH of the urine, Nitrazine—a new and sensitive indicator—faster and more accurate than litmus—may be used. When the pH is ascertained, if it is not within the desired range it may be brought within this limit by the use of synergistic drugs or the ketogenic diet. The most desirable range for combating pyogenic organisms when Serenium is used is from 5.6 to 4.6 on the acid side and up to 7.6 on the alkaline side.

Serenium is an antiseptic dye of high purity and uniformity. It is non-irritating and non-toxic in therapeutic doses. It is useful in the treatment of genito-urinary infections because of its highly bacteriostatic action on urinary pyogenic organisms.

These two modern products—Serenium and Nitrazine—are available only under the Squibb label. Serenium is marketed in bottles of 25, 50 and 500 chocolate-coated tablets of 0.1 gram each. Nitrazine is available in paper strips, 100 to a vial, 10 vials to a box, and as a 0.1 per cent solution in dilute alcohol in 4-oz. and 16-oz. bottles, together with color charts.

For literature on Serenium, Nitrazine or the ketogenic diet address Professional Service Department, 745 Fifth Avenue, New York City

E·R·SQUIBB & SONS, NEW YORK

MANUFACTURING CHEMISTS TO THE MEDICAL PROFESSION SINCE 1858.

Mellin's Food

Milk Modifier

contains

Maltose and Dextrins
Cereal Proteins
Minerals

Formula Card and samples of Mellin's Food sent to physicians upon request.

Feeding Formula

For an Infant 2 months old
Weight 10 pounds

Whole Milk 16 ounces
Water 12 ounces
Mellin's Food 6 level tablespoons

This is a typical example of food mixtures for well infants as suggested on the card, "Formulas for Infant Feeding," arranged for physicians' use.

This mixture provides for an intake of the following food constituents and liquid for each pound of body weight:

2.0 grams of proteins
1.8 grams of fat
5.5 grams of carbohydrates
0.5 grams of minerals
78.0 cubic centimeters of liquid

All suggested mixtures on the feeding card are well calculated to furnish food constituents in proportional amounts to satisfy the nutritive requirements in relation to the age and weight of the individual baby with a supply of liquid to maintain the water balance.

Constipation or other symptoms of intestinal disturbances are not likely to occur from the use of these mixtures and progressive gain may be expected.

Directions for using Mellin's Food are left entirely to the physician.

Mellin's Food Company
Boston, Mass.

MELLIN'S FOOD: Produced by an infusion of Wheat Flour, Wheat Bran and Malted Barley admixed with Potassium Bicarbonate—consisting essentially of Maltose, Dextrins, Proteins and Mineral Salts.

The Tulane University of Louisiana

GRADUATE SCHOOL OF MEDICINE

POSTGRADUATE instruction offered in all branches of medicine.

Review Courses:
January 4 to February 13, 1937.
February 15 to March 27, 1937.
March 29 to May 8, 1937.

SPECIAL COURSES:
Surgery, Gynecology and Obstetrics, beginning May 10, ending June 5, 1937.
Tropical Medicine and Parasitology, beginning June 14, ending July 24, 1937.

COURSES leading to a higher degree are also offered.

For bulletin furnishing detailed information address the

DEAN GRADUATE SCHOOL OF MEDICINE

1430 Tulane Avenue
New Orleans, La.

St. Elizabeth's Hospital

RICHMOND, VIRGINIA

Staff

J. Shelton Horsley, M.D., Surgery and Gynecology
John S. Horsley, Jr., M.D., Plastic and General Surgery
Guy W. Horsley, M.D., General Surgery and Proctology.
Douglas G. Chapman, M.D., Internal Medicine
Wm. H. Higgins, M.D., Consultant in Internal Medicine
Austin I. Dodson, M.D., Urology
Fred M. Hodges, M.D., Roentgenology
L. O. Snead, M.D., Roentgenology
Thos. W. Wood, D.D.S., Dental Surgery
Helen Lorraine, Medical Illustration

Assistant Attending Staff

Harry J. Warthen, Jr., M.D., Surgery
W. K. Dix, M.D., Internal Medicine
J. P. Baker, Jr., M.D., Internal Medicine
Marshall P. Gordon, Jr., M.D., Urology

Administration

N. E. Pate ..... Business Manager

● The operating rooms and all of the front bedrooms are now completely air-conditioned.

SCHOOL FOR NURSES

The Training School is affiliated with **Johns Hopkins Hospital** in Baltimore for a three months' course each, in Pediatrics and Obstetrics.

Address: DIRECTOR OF NURSING EDUCATION

Improved and Enlarged Laboratory Course

In line with our policy of turning out accomplished laboratory technicians we announce our course of

NINE FULL MONTHS

plus four to six months' internship in a hospital laboratory

Beginning September First

Send for Catalogue

Gradwohl School of Laboratory Technique

3514 Lucas Avenue
St. Louis, Mo.

R. B. H. GRADWOHL, M.D., Director

THE TUCKER SANATORIUM, INC.

212 West Franklin St. (Corner of Madison)

RICHMOND, VIRGINIA

This is the private Sanatorium for the Neurological Practice of Drs. Beverley R. Tucker, Howard R. Masters and James Asa Shield.

The Tucker Sanatorium is for the treatment of nervous and endocrine diseases. There are departments of massage, medicinal exercises, hydrotherapy and physiotherapy. The Sanatorium is large and bright, surrounded by a lawn and shady walks, large verandas and has a roof garden. It is situated in the best part of Richmond and is thoroughly and modernly equipped. The nurses are specially trained in the care of nervous cases.

Insane and acute alcoholic cases are not taken.

Alcoholism
Senility
Drug Addiction

A Modern Ethical Hospital at Louisville

Founded 1904

Mental
and
Nervous Diseases

BEAUTIFUL AND SPACIOUS GROUNDS AFFORD OUTDOOR RELAXATION

Our **ALCOHOLIC** treatment destroys the craving, restores the appetite and sleep, and rebuilds the physical and nervous condition of the patient. Whiskey withdrawn gradually; no limit on the amount necessary to prevent or relieve delirium.

MENTAL patients have every comfort that their home affords.

The **DRUG** treatment is one of gradual Reduction; it relieves the constipation, restores the appetite and sleep; withdrawal pains are absent. No Hyoscine or rapid withdrawal methods used unless patient desires same.

NERVOUS patients are accepted by us for observation and diagnosis, as well as treatment.

Select cases of SENILITY accepted. **Physiotherapy—Clinical Laboratory—X-Ray.** **Consulting Physicians.**

Rates and folder on request

THE STOKES HOSPITAL

Incorporated

Telephone, Highland 2101

E. W. STOKES, M.D., Medical Director, 923 Cherokee Road, Louisville, Ky.

DR. MOODY'S SANITARIUM

SAN ANTONIO, TEXAS

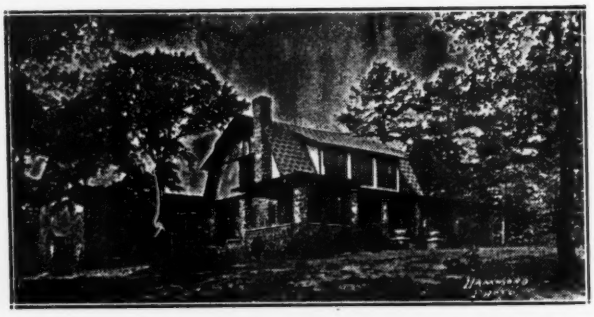
315 Brackenridge Avenue. **Phone: Fannin 5522**

For Nervous and Mental Diseases, Drug and Alcohol Addiction and Nervous Invalids Needing Rest and Recuperation

Established 1903. Strictly ethical. Location delightful summer and winter. Approved diagnostic and therapeutic methods. Seven buildings, each with separate lawns, each featuring a small separate sanitarium, affording wholesome restfulness and recreation, in doors and out doors, tactful nursing and homelike comforts.

G. H. MOODY, M.D.
Founder

J. A. McINTOSH, M.D., F.A.C.P.
Superintendent



Hoye's Sanitarium

"In the mountains of Meridian"

MERIDIAN, MISS.

For nervous and mental diseases, drug and alcohol addiction, rest and recuperation. Ten acres of beautiful grounds sufficiently removed from highway to insure privacy. All out-side rooms, connecting baths. Modern treatment.

Dr. M. J. L. Hoye, Supt.,
Formerly sixteen years Superintendent of East Mississippi State Hospital.

Saint Albans Sanatorium

RADFORD, VA.

A modern, ethical institution, fully equipped for the diagnosis, care and treatment of nervous and mental diseases and selected addiction cases. 2,000 feet elevation. Rates reasonable. Occupational and Hydrotherapy Departments.

J. C. KING, M.D. **JAMES KING, M.D.**
FRANK A. STRICKLER, M.D.

McGUIRE CLINIC

ST. LUKE'S HOSPITAL

Richmond, Virginia

. . . Medical and Surgical Staff . . .

General Medicine:
James H. Smith, M.D.
Hunter H. McGuire, M.D.
Margaret Nolting, M.D.
John Powell Williams, M.D.
Kinloch Nelson, M.D.
Clifford H. Beach, M.D.

Orthopedic Surgery:
William T. Graham, M.D.
D. M. Faulkner, M.D.
J. T. Tucker, M.D.

General Surgery:
Stuart McGuire, M.D.
W. Lowndes Peple, M.D.
Carrington Williams, M.D.
W. P. Barnes, M.D.

Pathology and Radiology:
S. W. Budd, M.D.

Roentgenology:
J. L. Tabb, M.D.

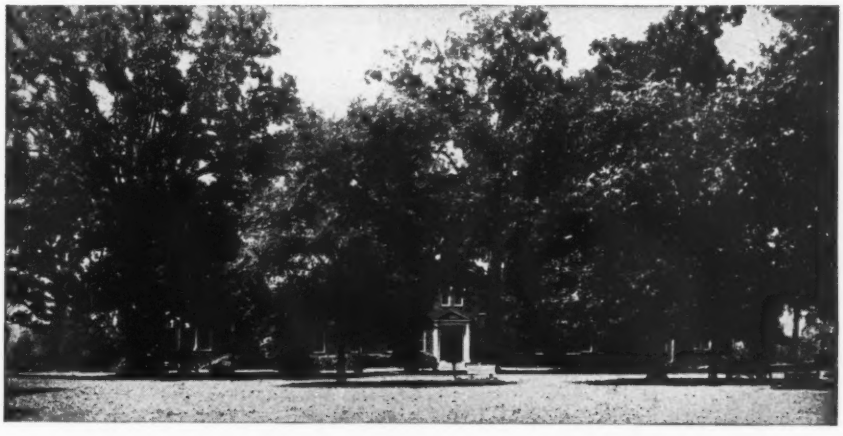
Obstetrics:
H. Hudnall Ware, Jr., M.D.

Urology:
Austin I. Dodson, M.D.

Eye, Ear, Nose and Throat:
F. H. Lee, M.D.

Dental Surgery:
John Bell Williams, D.D.S.
Guy R. Harrison, D.D.S.

WALTER R. WALLACE, M.D. O. A. SCHMID, M.D. HUGH W. PRIDDY, M.D.



THE WALLACE SANITARIUM

MEMPHIS, TENN.

For the treatment of Drug Addiction, Alcoholism, Mental and Nervous Diseases. Fully equipped for the care of patients admitted. Sixteen acres of beautiful grounds. Located in the eastern suburbs of the city at Southern Avenue and Cherry Road.

WESTBROOK SANATORIUM

Richmond *Virginia*

TELEPHONE: 5-3245

Department for Men:
J. K. Hall, M.D.

Associates:
O. B. Darden, M.D.
E. H. Alderman, M.D.
E. H. Williams, M.D.
Rex Blankinship, M.D.

Department for Women:
P. V. Anderson, M.D.

The institution is situated just beyond the northern border of the city on United States Highway Number 1.

The scope of the work of the sanatorium is limited to the diagnosis and the treatment of nervous and mental disorders and to the addictions to drugs and to alcohol. It affords also adequate facilities for rest and upbuilding under medical and nursing supervision.

The medical staff devotes its entire attention to the patients in the Sanatorium.

The institution maintains a school for trained attendants in which instruction in the care of the nervous and mentally sick is emphasized.

There are twelve separate buildings for patients, with 150 beds. Such a large group of buildings makes possible the more congenial grouping of patients. Rooms may be had single or en suite, with or without private bath. There are a few small cottages for the use of individual patients.

A comprehensive general physical and nervous examination is made of each patient. A mental examination is made when indicated. The examination is typed and a copy of it is available for the referring physician. Complete dental investigation is a part of the general survey.

A skilled teacher gives practical daily instruction to small groups in the arts and crafts. Helpful and interesting occupation in the out-of-doors is made possible for the men patients in the vegetable and flower gardens, on the truck farm, in the poultry yards, and in the dairy.

There are bowling, tennis, croquet and pool. On Sunday evening there is chapel service.

Detailed information is available for physicians.

Dr. Brawner's Sanitarium

SMYRNA, GEORGIA
(Suburb of Atlanta)

● *For Nervous and Mental Disorders, Drug and Alcohol Addictions*

Approved diagnostic and therapeutic methods. Hydrotherapy, Electrotherapy, Massage, X-ray and Laboratory.

Special Department for General Invalids and Senile Cases at Monthly Rates.

JAMES N. BRAWNER, M.D., Medical Sup't.
ALBERT F. BRAWNER, M.D., Resident Sup't.

Grace Lutheran Sanatorium FOR TUBERCULOSIS

SAN ANTONIO, TEXAS

ADMITS patients irrespective of religion or creed. An attractive institution in beautiful San Antonio. Climate unexcelled the year round for treatment of tuberculosis. Private rooms with bath and sleeping porch; individual cottages; high-class accommodations; Radiographic and Fluoroscopic service. Every room and cottage equipped with radio.

MODERATE RATES

For booklet and information address

REV. PAUL F. HEIN, D. D., Superintendent
701 South Zarzamora Street **San Antonio, Texas**

STUART CIRCLE HOSPITAL

Richmond, Virginia

Medicine:
MANFRED CALL, M.D.
ALEXANDER G. BROWN, JR., M.D.
OSBORNE O. ASHWORTH, M.D.
MANFRED CALL, III, M.D.
M. MORRIS PINCKNEY, M.D.
ALEXANDER G. BROWN, III, M.D.

Obstetrics:
GREER BAUGHMAN, M.D.
BEN H. GRAY, M.D.
WM. DURWOOD SUGGS, M.D.

Ophthalmology, Otolaryngology
CLIFTON M. MILLER, M.D.
R. H. WRIGHT, M.D.
W. L. MASON, M.D.

Physiotherapy:
ELSA LANGE, B.S., Technician
MARGARET CORBIN, B.S., Technician

Medical Illustrator:
DOROTHY BOOTH

Surgery:
CHARLES R. ROBINS, M.D.
STUART N. MICHAUX, M.D.
ROBERT C. BRYAN, M.D.
A. STEPHENS GRAHAM, M.D.
CHARLES R. ROBINS, JR., M.D.

Pathology:
REGENA BECK, M.D.

Urological Surgery:
JOSEPH F. GEISINGER, M.D.

Oral Surgery:
GUY R. HARRISON, D.D.S.

Roentgenology and Radiology:
FRED M. HODGES, M.D.
L. O. SNEAD, M.D.
R. A. BERGER, M.D.

Stuart Circle Hospital has been operated twenty-three years, affording scientific care to patients in General Medicine, Surgery, Obstetrics and the various medical and surgical specialties. Detailed information furnished physicians.

CHARLOTTE PFEIFFER, R.N., Superintendent

CITY VIEW SANITARIUM

For MENTAL and NERVOUS DISEASES and ADDICTIONS

ESTABLISHED IN 1907
AN ENTIRELY NEW PLANT ERECTED IN 1922

Separate buildings for men and women, ideally arranged and equipped with every facility for the comfort, care and treatment of the class of patients received. Situated in the midst of a fifty-acre tract, and surrounded by large groves and attractive lawns. Two resident physicians. Training school for nurses.

References: The Medical Profession of Nashville

JOHN W. STEVENS, M.D., Physician-in-Charge

NASHVILLE R. F. D. No. 1 TENNESSEE

On Murfreesboro Pike, one-half mile east of old location

The Cincinnati Sanitarium
Inc. 1873

For Mental and Nervous Diseases

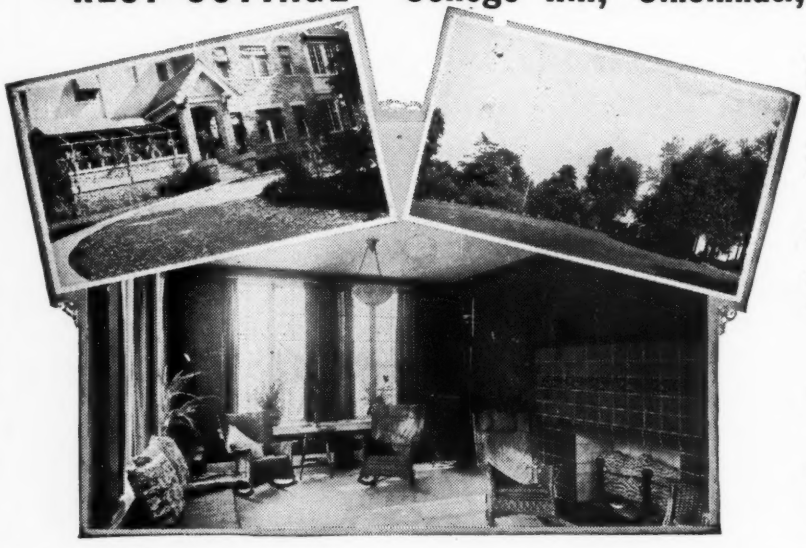
A strictly modern hospital fully equipped for the scientific treatment of nervous and mental affections. Situation retired and accessible. For details write for descriptive pamphlet.

Emerson A. North, M.D.
Charles Kiely, M.D.
Visiting Consultants

D. A. Johnston, M.D.,
Medical Director

H. P. COLLINS, Business Manager
Box No. 4, College Hill
CINCINNATI, OHIO

"REST COTTAGE" College Hill, Cincinnati, Ohio



For purely nervous cases, nutritional errors and convalescents.

Completely equipped for hydrotherapy, massages, etc.

Cuisine to meet individual needs.

Emerson A. North, M.D.
Charles Kiely, M.D.
Visiting Consultants

D. A. Johnston, M.D., Medical Director

H. P. Collins, Bus. Mgr., Box No. 4, College Hill, Cincinnati, Ohio

HILL CREST SANITARIUM

FOR NERVOUS AND MENTAL DISEASES AND ADDICTIONS

Established in 1925

A NEW PLANT WAS COMPLETED IN 1930

Thoroughly modern in architecture and construction. Eight departments—affording proper classification of patients. All outside rooms, attractively furnished. Several bathrooms and rooms with private bath on each floor. Also a spacious sun parlor in each department. Located on the crest of Higdon Hill, 1050 feet above sea level, overlooking the city, and surrounded by an expanse of beautiful woodland. Ample provision made for diversion and helpful occupation. Adequate night and day nursing service maintained.

JAMES A. BECTON, M.D., Physician-in-Charge

P. O. Box 96, Woodlawn Station, Birmingham, Ala. Phones: 9-1151 and 9-1152

Consultants: C. M. Rudulph, M.D.; H. S. Ward, M.D.; W. S. Littlejohn, M.D.

WAUKESHA SPRINGS SANITARIUM

For the Care and Treatment of

NERVOUS DISEASES

Building Absolutely Fireproof

BYRON M. CAPLES, M.D., Medical Director
FLOYD W. APLIN, M.D.

Waukesha, - - - - Wisconsin

The Ella Oliver Home

A private maternity home for the care and protection of unfortunate girls during pregnancy and confinement. Under auspices of Women's Christian Association of this city.

Staff physician in daily attendance or may have any other ethical physician. Modern hospital equipment, graduate nurse. Rates very reasonable. Adoption or board arranged for babies.

Strictest privacy is maintained, correspondence confidential.

For information, address

ELLA OLIVER HOME MEMPHIS, TENN.
903 Walker Ave. Phone: 3-0639

The "MESCO" Laboratories manufacture the largest line of Ointments in the world. Sixty different kinds. We are originators of the Professional Package. Specify "MESCO" when prescribing ointments. Send for lists.

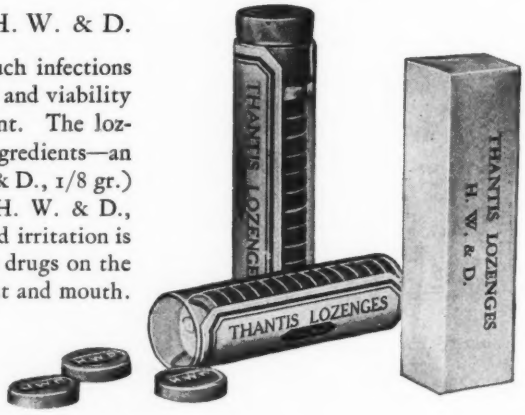
Manhattan Eye Salve Co.

LOUISVILLE, KENTUCKY

FOR the relief of various throat affections common in winter many physicians regard Thantis Lozenges, H. W. & D., as one of the most useful agents.

THANTIS LOZENGES, H. W. & D.

are helpful in the control of such infections because they reduce the number and viability of pathogenic organisms present. The lozenges contain two active ingredients—an antiseptic (Merodicein, H. W. & D., 1/8 gr.) and an anesthetic (Saligenin, H. W. & D., 1 gr.). Relief from soreness and irritation is provided by the action of these drugs on the mucous membranes of the throat and mouth.



Complete information and literature on request.

HYNSON, WESTCOTT & DUNNING, INC.

BALTIMORE, MARYLAND

DR. FRANK K. BOLAND

Atlanta, Georgia

President, Southern Medical Association, 1936-1937

SOUTHERN MEDICAL JOURNAL

JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION

PUBLISHED MONTHLY BY THE SOUTHERN MEDICAL ASSOCIATION AT BIRMINGHAM, ALA.

Volume 30 JANUARY 1937 Number 1

THE HEART IN ENDEMIC PELLAGRA*

By WILLIAM B. PORTER, M. D.
and
UPSHUR HIGGINBOTHAM, M. D.
Richmond, Virginia

There is convincing evidence that nutritional deficiency is intimately concerned with the pathogenesis of pellagra, yet endemic pellagra lacks much of the characteristic clinical behavior of a true deficiency disease.

Many of the diseases produced by avitaminosis affect, in a selective manner, certain tissues of the body, and one can anticipate precisely the kind of deficiency by noting the structures involved and the character of the tissue reactions.

In an effort to place pellagra more specifically in its relation to deficiency diseases which are known to affect the heart and vascular system, a systematic study of the heart has been conducted on all endemic pellagrins assigned to our hospital wards for treatment during the past five years.

Recently[1] in a brief discussion of endemic pellagra, we expressed the opinion that pellagra *per se* did not significantly affect the heart, and commented upon the universal absence of cardiac enlargement in pellagra.

In this study we are reporting 25 selected endemic pellagrins who were studied with the aid of teleroentgenograms, frequent electrocardiograms, and the usual standard clinical methods. *Table 1* is a summary of the important and significant data.

Electrocardiograms.—Only one patient, Case *25,* showed a disturbance of rhythm. He was 61 years of age, was a chronic alcoholic and had marked arteriosclerosis. The electrocardiogram showed an occasional auricular extrasystole.

An electrical axis indicating left ventricular preponderance occurred in three other patients, all of whom had elevated blood pressure: *Case 20* had a systolic blood pressure of 190, diastolic 105; *Case 24,* systolic blood pressure of 160, diastolic 100; and *Case 22,* systolic blood pressure of 195, diastolic 120.

T wave changes occurred in six electrocardiograms, yet, in only one instance, *Case 4,* could one justifiably relate the alterations to pellagra alone. In this patient there occurred an iso-electric TI and a deeply inverted TII and TIII. After eighteen days of treatment the electrocardiogram showed a return to normal *(Fig. 1).* This patient was a chronic alcoholic. *Case 6* showed an iso-electric TI, TII and TIII four days before death. At the time the electrocardiogram was made the oral temperature was 103.4 F. due to a complicating pyelonephritis. *Case 24* showed a left ventricular preponderance and an iso-electric TI, TII and TIII. In addition to elevated blood pressure, this patient had diabetes and arteriosclerosis, and was markedly psychotic. *Case 9* had an inverted TII and TIII which changed to an iso-electric TII and TIII when the patient's clinical condition improved. The pellagra was complicated by chronic alcoholism, a rectal stricture, purulent colitis, and a positive Wassermann. *Case 13* showed an iso-electric TI; the pellagra was complicated by a bilateral purulent otitis media.

Case 16 showed an iso-electric TI and TII twenty-two hours before death when the rectal temperature was 104.4 F. Bronchopneumonia was found at autopsy.

In summary, 10 patients showed changes in the electrocardiogram. Of these 5 had vascular disease, 1 purulent otitis media, 1 pyelitis, 1 diabetes, 1 rectal stricture and purulent colitis, and

*Chairman's Address, Section on Medicine, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Medicine, Medical College of Virginia.

Table 1

Case	Age	Sex	PULSE BLOOD PRESSURE Rate	Sys.	Dias.	Murmurs	TELEROENTGENOGRAM Transverse Diameter Cm.	Cardiothoracic Ratio Per cent	ELECTROCARDIOGRAM	COMPLICATIONS
1	21	FM	125	110	65	None	11.0	39	Normal	None
2	22	FM	136	128	90	None	11.6	44	Normal	Chronic alcoholism
3	23	FM	104	95	65	None	9.0	35	Normal	Otitis media; purulent colitis
4	26	FM	125	126	84	None	10.2	43	See chart	Chronic alcoholism
5	28	FM	121	105	65	None	12.0	47	Normal	None
6	28	FM	107	90	55	None	11.0	44	TI, TII, and TIII iso-electric	Rectal stricture
7	30	FM	118	110	76	None	10.5	40	Normal	None
8	32	FM	110	135	95	None	12.3	45	Normal	Alcoholism, laceration on skull
9	34	FM	115	102	65	None	10.5	44	1-2-36 TII and TIII inverted. 1-29-36 TII and TIII iso-electric	Rectal stricture and colitis
10	37	FM	102	105	60	None	11.0	45	Normal	None
11	37	FM	124	126	85	None	9.8	41	Normal	Alcoholism; neuritis
12	39	FM	125	115	80	None	10.0	42	Normal	Alcoholism; neuritis, severe
13	39	M	115	132	82	None	12.0	42	TI iso-electric	Purulent otitis media
14	40	FM	115	118	85	None	9.7	38	Normal	Positive Wassermann
15	42	M	109	145	95	None	11.5	38	Normal	Chronic alcoholism
16	43	FM	128	110	70	None	10.2	46	TI and TII iso-electric	Death. Heart weight 250 grams
17	44	M	100	110	70	None	11.0	37	Normal	Arteriosclerosis++
18	46	M	86	125	90	None	10.6	41	Normal	Pyelitis
19	47	M	118	120	80	None	11.0	39	Data lacking	Chronic alcoholism
20	49	M	94	190	105	None	12.5	48	Electrical axis; left preponderance	Essential hypertension
21	49	M	96	120	75	None	11.1	34	Normal	None
22	54	M	116	195	120	None	12.9	43	Electrical axis; left preponderance	Essential hypertension
23	59	M	88	160	100	None	14.0	46	Normal	Essential hypertension
24	60	FM	107	160	100	None	12.1	44	Electrical axis; left preponderance, TI, TII, TIII iso-electric	Arteriosclerosis, diabetes, psychosis
25	61	M	98	148	70	None	15.0	50	Ventricular extra-systole; left preponderance	Arteriosclerosis Alcoholism+++
Average	40		111	128	81		11.3	42		

1 chronic alcoholism. In this last patient one is justified in concluding that pellagra and alcoholism were the factors responsible for the electrocardiographic changes for, with clinical improvement, the alterations disappeared.

The weights of 14 hearts from patients dying from pellagra, in whom there were no important pathologic lesions involving the cardiovascular apparatus, have been tabulated in *Table 2.**

*We are indebted to Dr. James E. Paullin and Dr. Jack C. Norris of Emory University School of Medicine, Atlanta, Georgia, for the privilege of using some of their pathologic material. These data appear in *Table 2*.

Table 2

	Age	Male	Age	Female
	32	275	35	225
	65	300	40	225
	59	350	50	210
	30	235	57	300
	65	365	36	327
	25	300	31	250
	58	330	43	250
Average	47	307	41	255

The weight in grams of the hearts from 14 pellagrins.

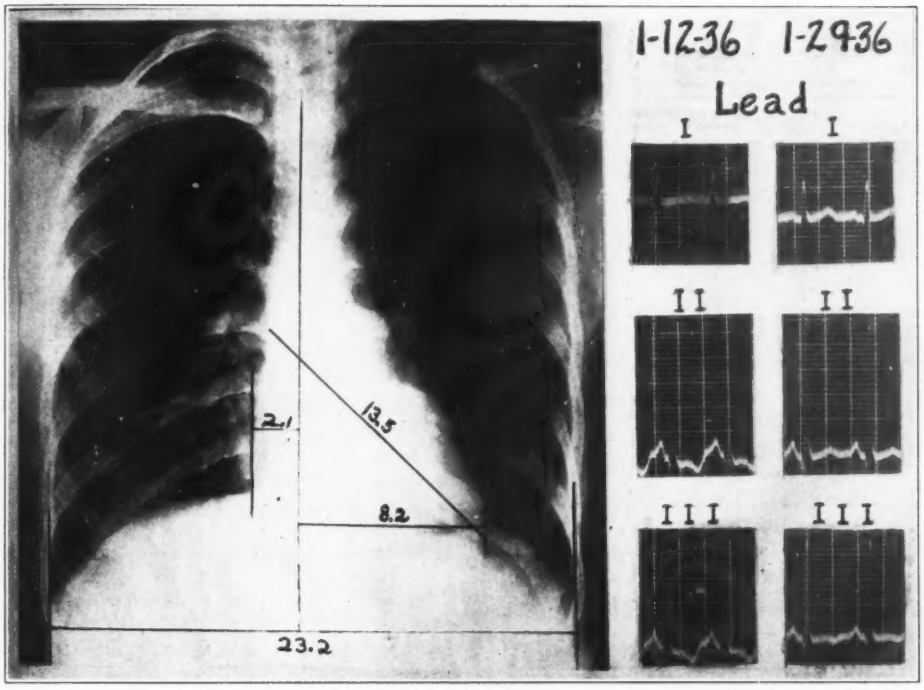


Fig. 1, Case 4

Cardio-thoracic ratio, 44 per cent. Predicted transverse diameter, Hodges and Eyster, 11.2 cm. Actual transverse diameter, 10.2 cm.

Electrocardiograms: January 12, 1936, Sinus tachycardia, rate 125; T-I, Iso-electric; T-II and T-III, inverted. January 29, 1936, Sinus tachycardia, rate 124; otherwise normal.

The data show that in this series of cases the average heart weight for the males was 307 grams and for the females 255 grams. White[2] gives as the normal heart weight for males 300 grams and for females 250 grams.

DISCUSSION

Feil[3] in a recent report on the electrocardiographic changes in pellagra says:

"Pellagra and beriberi apparently affect the heart physiologically in much the same way. The cardiac manifestations in pellagra, however, are less severe."

The heart in beriberi has been studied extensively by Scott and Herrmann,[4] Wenckebach,[5] and Keefer,[6] and all of these observers have been impressed by essentially the same type of cardiac changes. Wenckebach[5] has stressed the fact that in beriberi there is marked cardiac dilatation, particularly of the right ventricles, and that the heart is definitely increased in weight. He makes the interesting suggestion that the increase in weight is not due to a true hypertrophy, but to intracellular edema of the myocardium brought about by the physio-chemical changes induced in the muscle protoplasms by the deficiency state. Clinically, heart failure of the congestive type occurs and the failure is predominantly of the right ventricle. Marked distension of the veins, enlarged tender liver and extensive edema characterized the clinical picture. Various alterations have been recorded electrocardiographically in a small percentage of the patients studied, yet all authors agree that the changes are not characteristic or constant. Wenckebach[5] makes the unequivocal statement that the electrocardiogram is normal except that the conduction time is shortened.

During recent years we have observed a group of patients[7] who had organic cardiovascular disease and in whom subclinical beriberi apparently precipitated premature heart failure of the congestive type. There was characteristic reduction in heart size and prompt disappearance of venous stasis and edema when the patients were given an adequate diet and bed rest.

The results were similar to those seen in absolute B_1 avitaminosis and suggest that preexisting disease, particularly coronary insufficiency, may make the heart more vulnerable to B_1 deficiency.

During the time this study has been in progress twenty-three additional patients have been treated fer pellagra making a total of forty-eight endemic pellagrins who have been observed over varying periods of time. It is highly significant that in not a single instance has heart failure of the congestive type or angina pectoris developed. This fact clearly indicates that pellagra does not affect the heart to a degree sufficient to impair its functional integrity.

CONCLUSION

(1) The clinical evidence and necropsy studies show that the hearts of endemic pellagrins are normal or sub-normal in size.

(2) There are no characteristic electrocardiographic changes in endemic pellagra. Those changes that do occur are invariably explained by vascular or toxic complications.

(3) Beriberi and pellagra have no comparable effect on the heart. The difference is so absolute that one ventures the opinion that B_1 is not concerned with the pathogenesis of pellagra.

BIBLIOGRAPHY

1. Porter, William B.: The Heart and Deficiency Diseases. Modern Concepts of Cardiovascular Disease, **3**:9, 1934.
2. White, P. D.: Heart Disease, p. 453. New York: The Macmillan Company, 1931.
3. Feil, Harold: A Clinical Study of the Electrocardiogram and of the Phases of Cardiac Systole in Pellagra. Amer. Heart Jour., **11**: 173 (Feb.) 1936.
4. Scott, L. C.; and Herrmann, G. R.: Beriberi in Louisiana, with Especial Reference to Cardiac Manifestations. J.A.M.A., **90**:2083, 1928.
5. Wenckebach, K. F.: Das Beriberi-Herz. Berlin und Wien, Julius Springer, 1934.
6. Keefer, C. S.: The Beriberi Heart. Arch. Int. Med., **45**:1, 1930.
7. Porter, William B.: The Relation of Nutritional Deficiencies to the Development of Heart Failure in Organic Heart Disease. J.S.C. Med. Assn., **32**:145 (June) 1936.

A CLINICAL EVALUATION OF THE POTENCY OF VARIOUS EXTRACTS OF LIVER IN THE TREATMENT OF PELLAGRA*

By JULIAN M. RUFFIN, M.D.†
and
DAVID T. SMITH, M.D.††
Durham, North Carolina

The use of liver extract in the treatment of pellagra was introduced by Voegtlin in 1914.[18] Since that time numerous observers have reported excellent therapeutic results with various preparations of liver in both pellagra[3 9 13 12 10 4 14 15 19 8] and canine black tongue.[7 1 17]

In a series of forty patients with pellagra, observed in Duke Hospital, five were fed the hospital diet without additions. This diet was supplemented by yeast in four patients; wheat germ in four; yeast and wheat germ in one; and various extracts of liver in twenty-six (*Table 1*). The most rapid improvement was observed in those patients who received the liver extracts. Since it is now generally recognized that most patients with pellagra will recover without supplemental therapy when fed a well-balanced hospital diet, it is obvious that the potency of various liver preparations cannot be evaluated under such conditions.[2] It was necessary, therefore, to devise a diet as similar as possible to that upon which the patient was subsisting at the time the disease appeared. A basic diet similar to that used by Goldberger[5] in his prison farm experiments fulfills this requirement *(Table 2)*, and has been used in the studies here reported.

This basic diet was fed to 107 patients (*Table 3*), all of whom had the characteristic skin rash and one or more constitutional symp-

---

*Read in Section on Medicine, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Medicine, Duke University School of Medicine, Durham, North Carolina.

*A part of the cost of hospitalizing the patients used in this study was borne by a grant of twelve hundred ($1,200.00) dollars from the Eli Lilly Company and six hundred ($600.00) dollars from the Lederle Biological Laboratories. We wish to thank Eli Lilly Company, Lederle Biological Laboratories and the Valentine Meat Juice Company for furnishing us with the various extracts used in this study.

†Assistant Professor of Medicine, Duke University School of Medicine.

††Associate Professor of Medicine, Duke University School of Medicine.

Table 1

HOSPITAL DIET WITH VARIOUS SUPPLEMENTS

Treatment	No. Cases	Recovered	Died	Unimproved	Improved	Relapsed After Exposure	Comments
Hospital diet alone	5	2	2	0	1	0	One died of bronchopneumonia
Yeast	4	3	0	0	1	0	
Wheat germ	4	1	2	1	0	1	Died of bronchopneumonia
Valentine's E-29	14	12	2	0	0	0	Died of bronchopneumonia
Lederle's (I. M.) and yeast	1	1	0	0	0	0	
Wheat germ and yeast	1	1	0	0	0	0	Relapsed one month later
Yeast and Valentine's	4	4	0	0	0	0	
Yeast and Lilly's 343 (oral)	1	0	1	0	0	0	Died of bronchopneumonia
Wheat germ and Parke, Davis (oral)	1	0	0	0	1	0	Relapsed two months later
Lederle's (I. M.) and Valentine's	2	1	1	0	0	0	Died of septicemia
Parke, Davis	3	2	1	0	0	0	
Total	40	27	9	1	3	1	

Table 2

STANDARD BASIC DIET NO. 2

Article	Quantity (g.)	Protein (g.)	Fat (g.)	Carbohydrate (g.)	Minerals (grams)			Vitamins					Calories
					Ca	P	Fe	A	B	C	D	G	
Corn meal	92	8.3	2.0	69.0	0.011	0.1225	0.0006	———	+	———	———	±	
Cane syrup	105	....	....	89.2	.....	.....	.....	———	+	———	———	+	
Flour	111	12.5	1.2	83.4	0.022	0.1030	0.0010	———	+	———	———	—	
Lard	81	....	81.0	....	.....	.....	.....	———	—	———	———	—	
Rice	25	2.0	0.1	19.6	0.0023	0.0240	0.0002	———	—	———	———	—	
Field peas	90	19.2	1.4	54.6	0.0756	0.0760	0.0052	+	++	———	———	+	
Hominy grits	51	4.3	0.3	40.6	0.0056	0.0734	0.0005	———	+	———	———	—	
Fat salt pork	60	1.1	51.3	0.0	0.0011	0.0115	0.0001	———	—	———	———	—	
													2890.0
Cod-liver oil	90 cc.	....	90.0	....	.....	0.0117	.....	++++	—	.....	++++	.	810.0
Cevitamic acid	90 mg.	—	—	—	.....	.....	.....	———	—	++++	———	.	
Iron ammonium citrate	6	....	....	—	.....	.....	1.02	———	—	———	———	.	
Calcium gluconate	6	—	—	—	0.5580	.....	.....	———	—	———	———	.	
Cheese	60	17.4	21.6	—	0.5586	0.4098	0.0007	++	++	———	———	+	264.0
Total		64.8	248.9	356.40	1.2342	0.8319	1.0285	++++	++	———	++++	+	3964.0

toms of pellagra. Of this group thirty patients promptly recovered and failed to show any evidence of relapse even after exposure to sunshine, which we regard as an important criterion of the cure of the disease.[11] The remaining seventy-seven patients either failed to improve on the basic diet or relapsed after exposure to sunshine and were considered, therefore, suitable cases for an analytical study of liver therapy. Of these seventy-seven patients, one received yeast, two vitamin B_1 intramuscularly, five wheat germ, five lactoflavin*, and the remaining sixty-four were given various preparations of liver. No improvement was observed with lactoflavin** (*Chart 1*) or vitamin B_1.*** Three of the five patients who received wheat germ improved slowly and finally recovered. Rapid and complete recovery was noted in

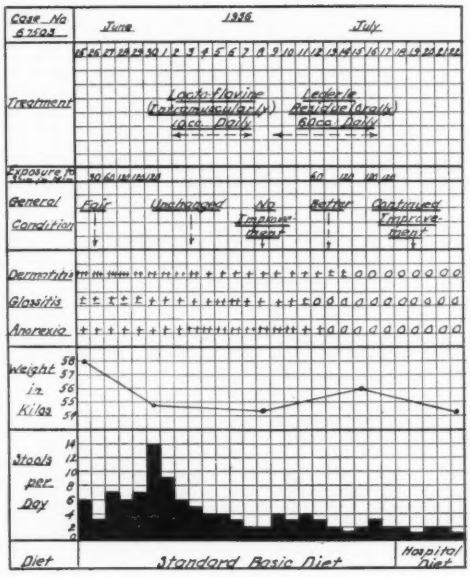


Chart 1

*Three of these five cases were reported in detail from this hospital by Dr. W. J. Dann in the *Journal of Nutrition*, **11**:451, 1936.

**This material was obtained through the courtesy of Dr. W. J. Dann and Dr. Paul Gyorgy from the Winthrop Chemical Company.

***A parenteral extract of rice polishings furnished through the courtesy of Eli Lilly & Company.

Table 3

BASIC DIET WITH VARIOUS SUPPLEMENTS

Treatment	No. of Cases	Recovered	Died	Unimproved	Improved	Relapsed After Exposure	Comments
Basic diet alone	30	30	0	0	0	0	
Yeast	1	1	0	0	0	—	
B-1 extract (Lilly)	2	0	0	1	1	1	Two recovered with other treatment
Wheat germ	5	3	0	2	0	—	One recovered and one died with other treatment
Lactoflavin	5	0	1	4	0	2	Four recovered after other treatment
Valentine's E-29	22	20	1	1	0	0	11 of these cases had failed to improve under other treatment
Valentine's residue†	6	4	0	2	0	0	One died later; one recovered with other treatment
Lilly's 343 (I.M.)	9	2	0	5	2	2	Usually some improvement of glossitis; appetite not improved
Lilly's 343 (oral)	1	0	0	1	0	—	140 c. c. for 6 days. Prompt recovery with other treatment
Parke, Davis (I.V.)	3	1	0	0	2	2	Marked improvement of glossitis; appetite not improved
Parke, Davis (oral)	1	1	0	0	0	0	
Lederle's (I.M.)	8	0	0	1	7	7	Marked improvement of glossitis and diarrhea; appetite not improved
266††	3	0	0	0	3	3	Marked improvement of glossitis. Diarrhea and appetite not improved
Lederle's residue†	7	3	0	3	1	0	
Lederle's residue and intramuscular extract	4	4	0	0	0	0	
TOTAL	107	69	2	20	16	17	

† Material from an aqueous extract of liver which is insoluble in 65-70% alcohol

†† A highly purified parenteral extract prepared by Dr. Y. Subbarow. Reference (16).

Table 4

BASIC DIET WITH VALENTINE'S LIVER EXTRACT

(1 c. c. derived from 7.5 grams)

Hist. No.	Before Treatment				Treatment		After Treatment				After Exposure			
	Dermatitis	Glossitis	Diarrhea	Anorexia	C. C.	Days	Dermatitis	Glossitis	Diarrhea	Anorexia	Dermatitis	Glossitis	Diarrhea	Anorexia
55089	+	++	0	+++	90	8	0	0	0	0	0	0	0	0
55963	+	+	+++	+	90	10	0	0	0	0	0	0	0	0
58663 (A)	+++	+++	++	+++	210	5	0	0	0	0	0	0	0	0
16778	+++	+++	++	++	90	12	0	0	0	0	—	—	—	—
20185	+++	++	0	+++	90	25	0	0	0	0	—	—	—	—
27213	++	+++	+	++	90	10	0	0	0	0	—	—	—	—
25823	+++	+	+	+	90	16	0	0	0	0	—	—	—	—
21054	+	+++	++	++	90	10	0	0	0	0	—	—	—	—
25528	++	++	0	+	90	7	0	0	0	0	0	0	0	0
66887	+	++	++	++	90	10	0	0	0	0	0	0	0	0
50982	+	++	+++	+++	90	10	0	0	+	0	0	0	0	0
68337	++	+	++	0	90	5	0	0	0	0	0	0	0	0
13113	0	+	0	++	90	8	0	0	0	0	—	—	—	—
40052	0	+	+	+	90	10	0	0	0	0	0	0	0	0
13011	+	+	0	++	90	10	0	0	0	0	0	0	0	0
14258†	++	++	+++	++	60	6	+	+	+++	++	—	—	—	—
15803	0	++	+	++	90	10	0	0	+	0	—	—	—	—
53398	0	++	++	+	90	10	0	0	0	0	—	—	—	—
26017†	++	+	+++	+	90	10	+	0	0	0	—	—	—	—
4866	++	++	0	0	90	10	0	0	0	0	—	—	—	—
11803	0	++	++	+++	90	10	0	0	0	0	0	0	0	0
53870	++	++	+++	++	90	5	0	0	0	0	0	0	0	0

†Died. A—Alcoholic.

In this and in all subsequent tables + means a positive reaction, 0 a negative one and — not tested.

Table 5

BASIC DIET WITH LILLY'S PARENTERAL EXTRACT

(1 c. c. derived from 5 grams)

Hist. No.	Before Treatment				Treatment		After Treatment				After Exposure			
	Dermatitis	Glossitis	Diarrhea	Anorexia	C. C.	Days	Dermatitis	Glossitis	Diarrhea	Anorexia	Dermatitis	Glossitis	Diarrhea	Anorexia
13148	++	+++	0	++	5	12	+	+++	0	++*	—	—	—	—
14951	++	0	0	++	5	10	0	0	0	++	0	0	0	++
15844	+++	++	0	++	10	10	0	0	0	++	++	0	0	++*
40593	+	0	++	+	3	10	0	0	0	0	—	—	—	—
40052	+	+	+	+	10	8	0	0	0	0	+	+	+	+*
13011		++	+++	++	5	6		++	0	+++*	—	—	—	—
15803	+	++	++	++	10	5	0	++	++	++*	—	—	—	—
11803		++	++	+++	5	7		++	++	+++*	—	—	—	—
13889	+	++	0	+++	5	7	0	++	0	+++*	—	—	—	—

*Recovered with other treatment.

twenty of the twenty-two patients receiving orally an aqueous extract, "solution liver extract—Valentine (N.N.R.)." Only three of twenty-three patients who were given the parenteral extracts made a complete recovery; six were unimproved, and eleven improved temporarily but relapsed after exposure to sunshine (*Table 3*). The striking effect of daily doses of 90 c.c. (3 oz.) of the aqueous liver extract upon the clinical manifestations of the disease is shown in *Table 4*. Exposure to sunshine after treatment failed to produce a relapse in a single case.

Nine patients received solution of liver extract—Lilly (N.N.R.) intramuscularly in varying doses. Two of these recovered; five were unimproved; two improved, but relapsed after exposure (*Table 5*).

Eight patients received intramuscularly "Lederle solution liver extract parenteral refined and concentrated (N.N.R.)." Seven of these improved with this treatment, but relapsed after exposure; one was unimproved (*Table 6*).

Three patients received intravenously "liver extract (intravenous) Parke, Davis & Co." One recovered and the other two improved, but relapsed after exposure to sunshine (*Table 7*). The clinical course of a patient illustrating temporary improvement after the intravenous administration of this extract, with spontaneous relapse and subsequent recovery under treatment with the Valentine's extract, is shown in *Chart 2*.

A highly purified extract of liver, called "266," was prepared from Lederle's intramuscular liver extract by Dr. Y. Subbarow.* This has been shown to be effective in the treatment

*This material was furnished us through the courtesy of Dr. Y. Subbarow and Dr. B. M. Jacobson.

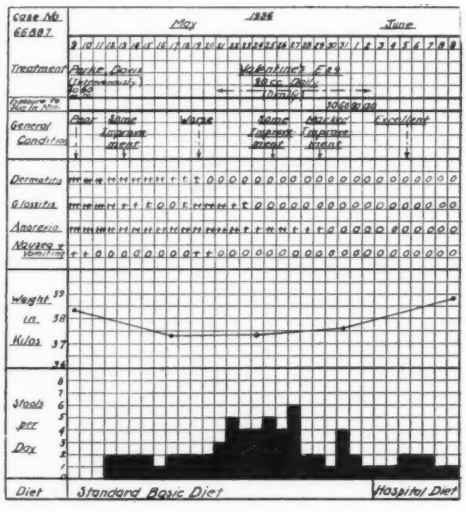


Chart 2

Table 6

BASIC DIET WITH LEDERLE'S PARENTERAL EXTRACT

(1 c. c. derived from 33.3 grams*)

(1 c. c. derived from 100 grams**)

Hist. No.	Before Treatment				Treatment		After Treatment					After Exposure		
	Dermatitis	Glossitis	Diarrhea	Anorexia	C. C.	Days	Dermatitis	Glossitis	Diarrhea	Anorexia	Dermatitis	Glossitis	Diarrhea	Anorexia
9237	++	++	++	++	3*	8	0	0	+	+		0	++	++†
37739	++	+++	+	0	3*	12	0	0	++	++	+	+	++	++†
2214	++	++	+++	++	3*	7	0	+	+++	+++†		—	—	—
68337	++	+++	+++	++	1**	7	0	0	+++	0	+++	0	+++	0†
31891	++	+++	+++	+++	1**	12	0	0	0	+++	0	+	0	+++†
70742-A	++	++	++	+++	1**	7	0	0	+	+++	+	+	++	+++†
69807	+++	+++	+++	+++	1**	7	0	0	0	+++†	0	0	0	+++†
72858-A††	++	+++	+++	+++	1**	10	0	+	0	+++†	—	—	—	—

A—Alcoholic.

††Died.

†Recovered with other treatment.

Table 7

PARKE, DAVIS'S PARENTERAL EXTRACT

(Intravenously)

(1 c. c. derived from 5 grams)

Hist. No.	Before Treatment				Treatment		After Treatment				After Exposure			
	Dermatitis	Glossitis	Diarrhea	Anorexia	C. C.	Days	Dermatitis	Glossitis	Diarrhea	Anorexia	Dermatitis	Glossitis	Diarrhea	Anorexia
66633	++	++	+	0	40	2	0	0	0	0	0	0	0	0
25528	++	+++	0	++	50	2	0	0	0	0	+	++	0	+*
66887	++	+++	0	+++	100	1	0	0	++	+++	0	++	++	+++*

*Recovered with other treatment.

of pernicious anemia.[16] This material was given to three patients, all of whom showed prompt improvement, but relapsed after exposure to sunshine (*Table 8*). The effect of treatment with "266" is illustrated by *Chart 3*.

Most of the patients receiving parenteral liver extracts reported subjective improvement after a few days of treatment. The acute glossitis subsided promptly in sixteen of twenty-one patients. It was noted that failure of the tongue to improve occurred in those patients receiving the extract derived from less than 400 grams of liver (*Table 9*). There was little if any improvement in the appetite even after enormous doses of liver extract, a result which is in sharp contrast to the effect of liver in the treatment of pernicious anemia and sprue. No constant effect upon the diarrhea was observed, but it was our impression that the larger doses of liver extract, given parenterally, usually resulted in improvement. The failure of the parenteral liver extracts to effect the complete

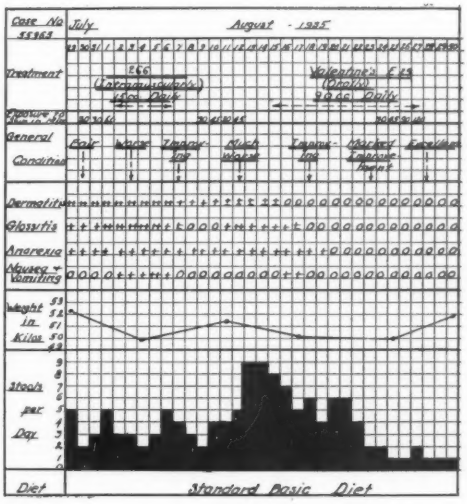


Chart 3

Table 8

SUBBAROW'S 266 PARENTERAL EXTRACT

(1 c. c. derived from 45 grams)

Hist. No.	Before Treatment				Treatment		After Treatment				After Exposure			
	Dermatitis	Glossitis	Diarrhea	Anorexia	C. C.	Days	Dermatitis	Glossitis	Diarrhea	Anorexia	Dermatitis	Glossitis	Diarrhea	Anorexia
55689	++	++	0	++	15	7	0	0	+	++	+	++	++	++*
55963-A	++	++	++	+	15	7	0	0	++	++	0	++	+++	+++*
53398-A	++	+++	++	+	15	10	0	0	+	+	0	++	+	++*

*Recovered with other treatment.
A—Alcoholic.

Table 9

RELATIONSHIP OF SIZE OF DOSE OF PARENTERAL LIVER TO GLOSSITIS, DIARRHEA, AND ANOREXIA

(Basic Diet)

Hist. No.	Preparation	Dosage in Grams**	Glossitis		Diarrhea		Anorexia	
			Before	After	Before	After	Before	After
13011	Lilly (343)	150	++	++	+++	0	++	++
40593	Lilly (343)	150	0	0	++	0	+	0
11803	Lilly (343)	175	++	++	++	++	+++	+++
13889	Lilly (343)	175	++	++	0	0	+++	+++
14951	Lilly (343)	250	0	0	0	0	++	++
15803	Lilly (343)	250	++	++	++	++	++	++
13148	Lilly (343)	300	+++	+++	0	0	++	++
40052	Lilly (343)	400	+	0*	+	0*	+	0*
66633	Parke, Davis (I.V.)	400	++	0	+	0	0	0
25528	Parke, Davis (I.V.)	500	+++	0*	0	0	++	0*
66887	Parke, Davis (I.V.)	500	+++	0*	0	++	+++	+++
15844	Lilly (343)	500	++	0	0	0	++	++
68337	Lederle (1 c. c.)	700	+++	0	+++	+++	++	0
70742 (A)	Lederle (1 c. c.)	700	++	0*	++	+*	+++	+++
69807	Lederle (1 c. c.)	700	+++	0	+++	0	+++	+++
2214	Lederle (3 c. c.)	700	++	+	+++	+++	++	+++
9237	Lederle (3 c. c.)	800	++	0	++	+*	++	+*
72858 (A)	Lederle (1 c. c.)	1000	+++	+	+++	0	+++	+++
31891	Lederle (1 c. c.)	1200	+++	0*	+++	0	+++	+++
37739	Lederle (3 c. c.)	1200	+++	0*	+	++	0	++
55689	266	4725	++	0*	0	+	++	++
55963 (A)	266	4725	++	0*	++	++	+	++
53398 (A)	266	6750	+++	0*	++	+	+	+*

*Relapsed after exposure to sunshine.

**Total number of grams from which extract was derived.

recovery which was observed after the use of the aqueous extract, "solution liver extract—Valentine (N.N.R.)," suggested (1) that the liver, to be effective, must be given orally, or (2) that in the process of preparation some factor present in the aqueous extract was either discarded or destroyed.

To test the first hypothesis a patient was given 140 c. c. daily of Lilly's intramuscular extract orally for six days. This amount represented a daily dose of extract derived from 700 grams of liver, a total dosage of 4,200 grams. As shown in *Chart 4*, this proved totally ineffective in curing the disease. It seemed probable, therefore, that the missing factor had been discarded in the process of preparing the parenteral extracts. The addition of 95 per cent alcohol to an aqueous extract of liver results in a clear supernatant fluid containing most of the pernicious anemia factor, and a dark brown viscid residue. The supernatant fluid forms the basis of all parenteral extracts. Samples of the residue were furnished us by two manufacturers* and these were used in the treatment of thirteen patients. Six patients received the Valentine's residue in doses of 90 c. c. daily, an amount derived from 680 grams of liver (*Table 3*). Four patients recovered completely and two were unimproved. The remaining seven patients received varying doses of the Lederle's residue (*Table 10*). Three recovered, one improved, and three were unimproved. It was noted that those who recovered had received the residue derived from very large amounts of liver (19,000 to 28,000 grams). With one exception those who received the material derived from less than 10,000 grams of liver failed to improve or relapsed after exposure. This residue (Lederle's) in daily doses of 90 c. c. (derived from 2,880 grams of liver) promptly restored the blood to normal

*Valentine Meat Juice Company and Lederle Biological Laboratories.

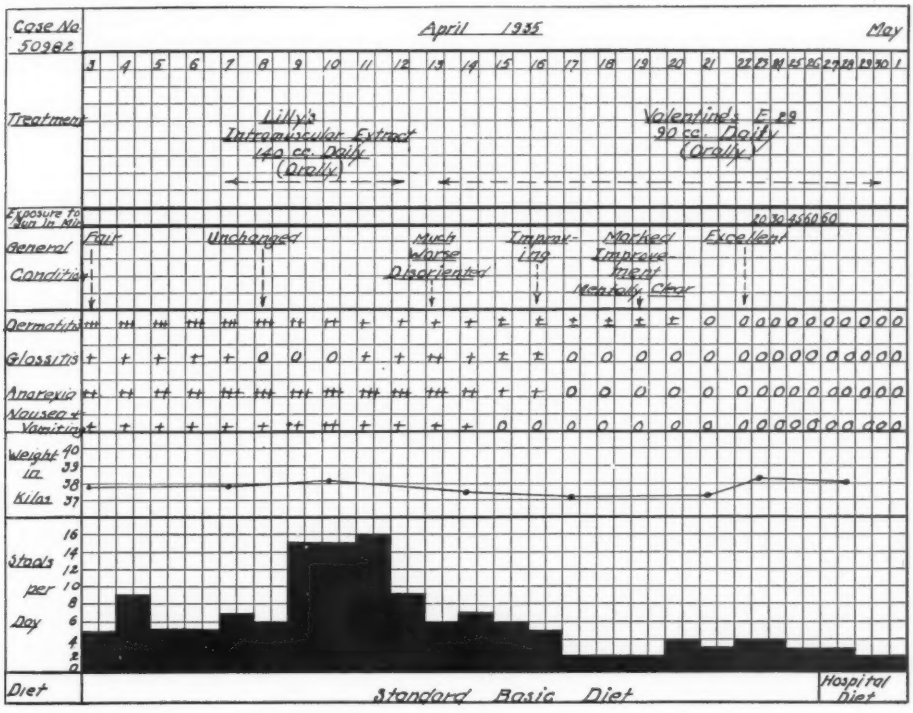


Chart 4

Table 10

BASIC DIET WITH LEDERLE'S RESIDUE

(1 c. c. derived from 32 grams)

Hist.No.	Before Treatment				Treatment		After Treatment				After Exposure			
	Dermatitis	Glossitis	Diarrhea	Anorexia	C. C.	Days	Dermatitis	Glossitis	Diarrhea	Anorexia	Dermatitis	Glossitis	Diarrhea	Anorexia
55563	++	++	0	++	90	10	0	0	0	0	0	0	0	0
67503	+	+	+	++	60	10	0	0	0	0	0	0	0	0
31891	0	+	0	++	30	8	0	0	0	++*	—	—	—	—
70742-A	+	+	++	+++	30	10	0	0	++	+++*	—	—	—	—
69807	0	0	0	++	30	10	0	0	++	+++*	—	—	—	—
38378	+++	+++	0	+++	24	7	0	+++	++	+++*	—	—	—	—
68007	+++	++	0	+++	24	13	0	0	0	0	0	0	0	0

*Recovered with other treatment.

levels in one case of pernicious anemia and in one case of sprue. This indicates that, in large doses, the residue contains both the pernicious anemia and pellagra factors.

Since it had been observed that the intramuscular extract was only partially effective and the residue ineffective in small doses in curing pellagra, the combination of the two was used in four patients. One patient (*Chart 5*) received 24 c. c. of Lederle's residue (derived from 768 grams) daily without improvement. He recovered promptly after the addition of 1 c. c. of Lederle's intramuscular extract daily. Three other patients were given the intramuscular Lederle extract first. This resulted in marked improvement in the tongue and the diarrhea, but did not affect the anorexia. Furthermore, two of these three patients relapsed when exposed to sunshine. The intramuscular extract was discontinued and small doses of the Lederle residue (24-30 c. c. daily) were given for 8-10 days. One patient improved slightly, one remained unchanged, and one became definitely worse (*Chart 6*). When the intramuscular extract and the residue were given simultaneously in doses which had previously proven ineffective when administered alone, dramatic recovery occurred (*Table 11*).

SUMMARY

This study supports the conclusion of Goldberger[6] that pellagra results from a dietary deficiency. The disease may be prevented or cured by a well-balanced diet. When any of the commercial preparations of liver are given as a supplement to the usual hospital diet, rapid improvement occurs. The tendency of pellagrins to recover when fed a hospital diet renders it impossible to evaluate the potency of various preparations of liver unless they are eating a diet similar to that consumed prior to the development of the disease. Even when eating this basic diet, which produces black tongue when fed to dogs,[10] many patients recover. Therefore, a preliminary period of observation is necessary and only those patients who fail to

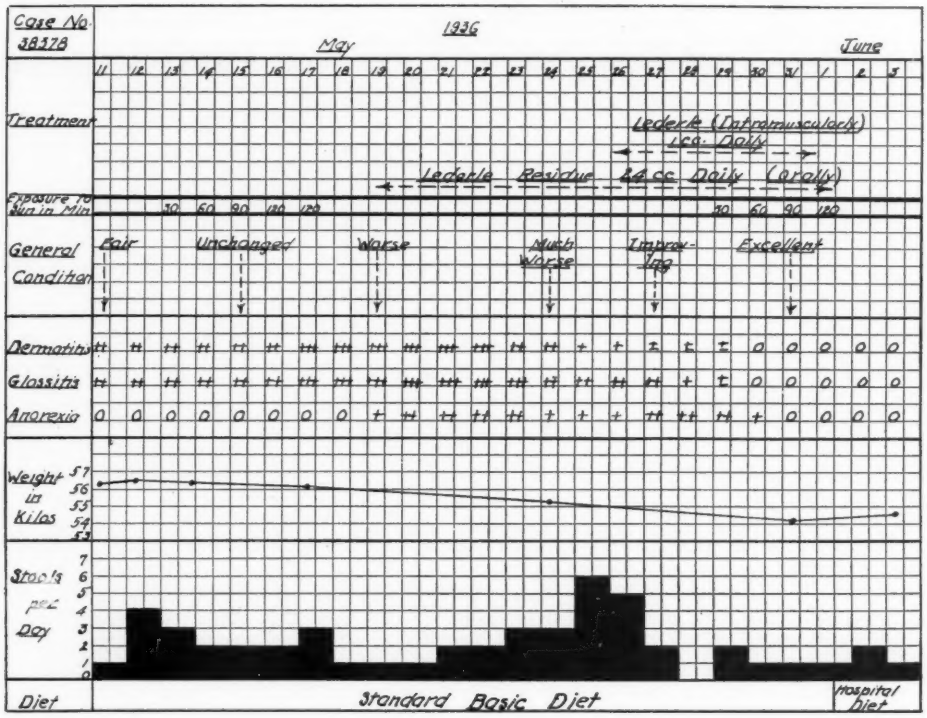


Chart 5

improve on the basic diet, or relapse after exposure to sunshine, are suitable for an assay of the potency of various preparations of liver.

The administration of parenteral extracts of liver results in subjective improvement and relieves the tongue symptoms in patients with pellagra. Anorexia, however, is not affected and relapse may occur after exposure to sunshine. It is our impression that the parenteral extracts are all equally effective if given in sufficiently large doses (*Table 9*).

It was suggested to us by Dr. Y. Subbarow,

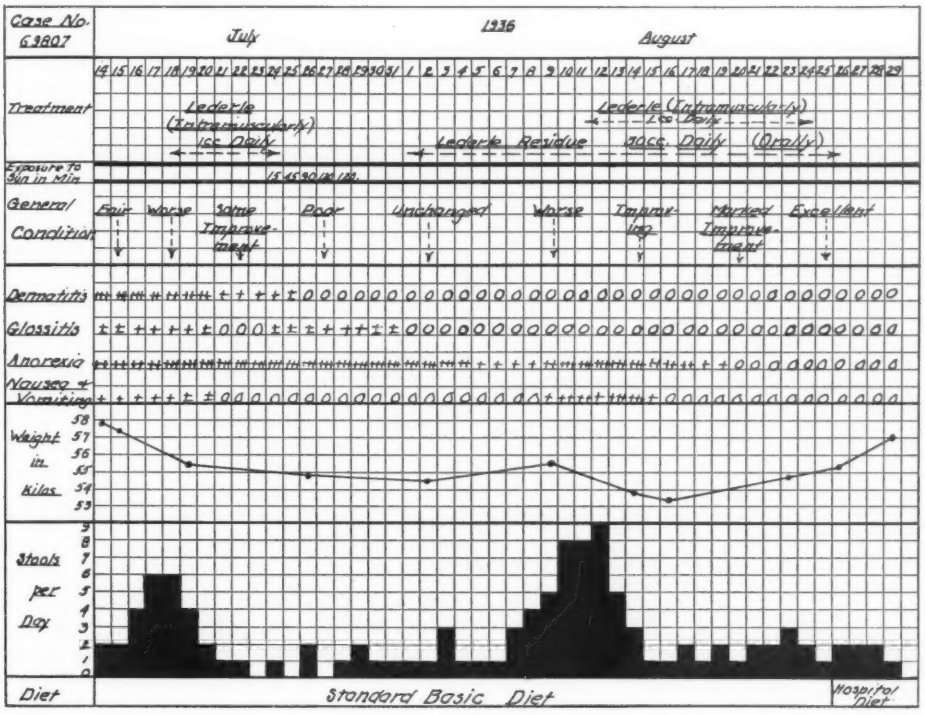


Chart 6

Table 11

BASIC DIET WITH LEDERLE'S RESIDUE AND INTRAMUSCULAR EXTRACT

Hist. No.	Before Treatment				Treatment		After Treatment				After Exposure			
	Dermatitis	Glossitis	Diarrhea	Anorexia	C. C.	Days	Dermatitis	Glossitis	Diarrhea	Anorexia	Dermatitis	Glossitis	Diarrhea	Anorexia
38378	0	+++	++	+++	1 24	7 (I.M.) 7 (Res.)	0	0	0	0	0	0	0	0
70742-A	0	0	++	+++	1 30	7 (I.M.) 7 (Res.)	0	0	+	+	—	—	—	—
69807	0	0	++	+++	1 30	7 (I.M.) 7 (Res.)	0	0	0	0	—	—	—	—
31891	0	0	++	0	1 30	7 (I.M.) 7 (Res.)	0	0	0	0	—	—	—	—

as a result of his studies of black tongue in dogs, that there is more than one factor in liver necessary for the cure of pellagra. Parenteral extracts unquestionably contain one of the factors necessary for the cure of pellagra, but will not effect a complete recovery when the patient is subsisting upon a deficient diet.

No appreciable improvement in the patient's condition follows the use of small doses of the residue. However, an ineffective dose of the residue given simultaneously with the partially effective parenteral extract results in complete recovery. The aqueous extract, "solution liver extract—Valentine (N.N.R.)," similar to that from which the parenteral extract and residue were derived, effects a dramatic and complete cure of the tongue symptoms, diarrhea and anorexia. None of these patients relapsed after exposure to sunshine.

CONCLUSIONS

(1) Parenteral extracts of liver contain a factor which alleviates the tongue symptoms, but which is only partially effective in the cure of pellagra.

(2) Complete recovery follows the administration of adequate doses of an aqueous extract, "solution liver extract — Valentine (N.N.R.)," and relapse does not occur after exposure to sunshine.

(3) This study suggests that the P-P factor of Goldberger is composed of two or more subfactors.

REFERENCES

1. Birch, T. W.; Gyorgy, P.; and Harris, L. J.: CCXXXV. The Vitamin B_2 Complex. Differentiation of the Anti-Black Tongue and the "P. P." Factors from Lactoflavin and Vitamin B_6 (So-Called "Rat Pellagra" Factor). Parts I-VI. Biochemical Jour., **29**:2830, 1935.
2. Blackford, Staige D.: Pellagra. Va. Med. Mo., **61**:140, 1934.
3. Boggs, T. R.; and Padget, Paul: Pellagra: Analysis of 102 Cases. Bull. Johns Hopkins Hospital, **50**:21 (Jan.) 1932.
4. Fouts, P. J.; and Zerfas, L. G.: Pellagra in Indiana and Its Treatment with Liver Extracts. Jour. Ind. Med. Assn., **27**:196, 1934.
5. Goldberger, J.; and Wheeler, G. A.: Experimental Pellagra in the Human Subject Brought About by a Restricted Diet. Public Health Reports, **30**:3336, 1915.
6. Goldberger, J.; Waring, C.H.; and Willets, D. G.: Prevention of Pellagra. Orphanage Studies. Public Health Reports, **30**:3117, 1915.
7. Goldberger, J.; and Sebrell, W. H.: The Blacktongue Preventive Value of Minot's Liver Extract. Public Health Report, **45**:3064, 1930.
8. Haden, R. L.: Multiple Specific Nutritional Deficiency Disease in the Adult. J.A.M.A., **106**:261, 1936.
9. Ramsdell, R. L.; and Magness, W. H.: Parenteral Liver Extract Therapy in Pellagra. Amer. Jour. Med. Sci., **185**: 568, 1933.
10. Ruffin, J. M.; and Smith, D. T.: The Treatment of Pellagra with Certain Preparations of Liver. Amer. Jour. Med. Sci., **187**:512, No. 4 (April) 1934.
11. Smith, D. T.; and Ruffin, J. M.: The Effect of Sunlight on the Symptoms of Pellagra. Arch. Int. Med., in press.
12. Smith, J. H.: The Treatment of Pellagra. Sou. Med. Jour., **27**:163, 1934.
13. Spies, T. D.: The Treatment of Pellagra by Means of Parenteral Liver Extract. Proc. Soc. Exp. Biol. & Med., **31**: 363, 1933.
14. Spies, T. D.: The Treatment of Pellagra. J.A.M.A., **104**:1377, 1935.
15. Spies, T. D.: The Medical Treatment of Early Pellagra. J.A.M.A., **105**:1028, 1935.
16. Subbarow, Y.; Jacobson, B. M.; and Fiske, C. H.: A Partially Purified Liver Extract Therapeutically Effective in Pernicious Anemia. New England Jour. Med., **214**: 194, 1936.
17. Subbarow, Y.; Jacobson, B. M.; and Fiske, C. H.: The Separation of the Substances in Liver which Are Reticulocytogenic in the Guinea-Pig and which Are Therapeutically Effective in Experimental Canine Black Tongue. New England Jour. Med., **212**:663, 1935.
18. Voegtlin, C.: Recent Work on Pellagra. Public Health Reports, **35**:1435, 1920.
19. Wylie, W. D.: The Treatment of Pellagra. Sou. Med. & Surg., **97**:14 (Jan.) 1935.

SOME FACTORS IN THE ETIOLOGY OF PELLAGRA*

By V. P. SYDENSTRICKER, M.D.
and
J. W. THOMAS, M.D.
Augusta, Georgia

The definitive etiology of pellagra remains obscure. No theory yet advanced holds in all instances or fully explains all the phenomena of the syndrome. Particularly is this true of its tendency to seasonal occurrence and relapse, periodic increase and decrease and occasional epidemic prevalence. Yet certain factors assume importance in all epidemics and in all considerable series of cases. Poor diet with avitaminosis, intoxication, particularly chronic alcoholism, infection and exposure to sunlight are prominent in varying frequency in all group histories. Each and all can be ruled out in many cases. This lack of consistency in presumptive etiology has been confusing and has led to empiricism in therapy and perhaps to neglect of critical observation. The various lesions of the disease have been a pathological problem. The dermatitis is distinctive, the glossitis with papillary atrophy and the atrophic state of the gastrointestinal mucosa have much in common with pernicious anemia and sprue. The frequent fatty degeneration of the liver is of possible significance. The extensive changes in the central nervous system find no exact parallel in the infections or deficiency diseases. Degeneration of the heart muscle which is a frequent

---

*Read in Section on Medicine, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Internal Medicine, University of Georgia School of Medicine, and the University Hospital, Augusta, Georgia.

clinical and pathological finding has largely been overlooked in descriptions of pellagra.

It is justifiable to consider the various possible etiological factors and to attempt to arrive at some common denominator which might correlate them. Poor diet and avitaminosis must be placed first. Since the time of Casal, pellagra has been most common among the poor and in areas where maize has formed an important portion of the diet. The possible relation of maize will be noted later. The prevailing diet in all areas of endemic pellagra is poor in protein of good biologic value and in vitamin B_2, yet all poor diets do not produce pellagra. In central Europe during the last two years of the World War the diet of the civilian population was infinitely worse than anything we have known, but pellagra was infrequent there. During the same time it was a plague among the Turkish prisoners in Egypt, whose diet, while poor, was at least as good as that of the populace in Germany and Austria, but of different composition. The specific effect of diet becomes more uncertain in view of the development of pellagra in hospitalized patients adequately fed[1] and the recovery of pellagrins on strict "pellagra producing" diet.[2 3 4]

Like dietary deficiency, exposure to sunlight has been considered a factor of major importance. Seasonal incidence and perhaps periodic epidemicity have been attributed to variations in the intensity of solar radiation. It is interesting and possibly significant that pernicious anemia is prevalent in areas of deficient solar radiation and that pellagra is rare in these areas. Conversely pellagra occurs most frequently in regions of adequate or excessive solar radiation, particularly in the subtropical zones. Here, however, a paradox is encountered in the fact that pellagra is not particularly frequent in the tropics, where the effects of sunlight should be maximal. It seems unlikely that sunlight itself is an important etiologic item; it is more probable that food habits are of much greater significance and that sunlight causes skin lesions because of a perversion of physiology in the individual. This seems all the more likely in view of the fact that x-rays and chemical irritants occasionally activate pellagrous dermatitis.

The theory of intoxication has been advanced by many students of pellagra and has the prestige of being the first to be widely accepted. As early as 1845 Roussel pointed out that the spread of pellagra in Europe corresponded with the adoption of Indian corn as a staple food. Lombroso and Bellardini, in 1871, proposed the hypothesis of poisoning by spoiled maize and the almost universal acceptance of this view probably hindered the progress of knowledge concerning the disease. Certainly corn is not always a factor, though recent observations suggest that it should not be entirely forgotten. Sabry[5] thinks that dioxyphenylamine derived from maize and beans and possibly poorly made spirits is the toxic substance producing pellagra. Copping,[6] studying the curative effects of grain extracts in "rat pellagra," noted results from maize which seem to indicate that a definitely deleterious substance may be present. Alcoholic intoxication is so frequently associated with pellagra that there can be no doubt of an etiologic relationship. Alcohol seems to play a greater part in the incidence of pellagra in cities and in cool climates than in rural areas and the subtropical zones. Quite recently Berondes[7] has suggested the possible relation of selenium poisoning to the syndrome of pellagra. A toxic origin for pellagra has been tacitly accepted by many neuropathologists on account of the nature of the lesions of the central nervous system.

Infection seemed the only adequate explanation of the epidemic pellagra which was seen during the years following 1906. Many still feel that an infectious agent must be sought in spite of Goldberger's negative results in the rather crucial experiments at Spartanburg in 1917. Recently Tucker[8] has proposed that a virus may be the true etiologic factor and that dermatitis and lesions of the mucous membranes may be the result of disease of the posterior spinal roots, while changes in the brain, cord and sympathetic ganglia are the primary manifestations of the disease.

The results of various types of treatment have been almost as confusing as the question of etiology and conclusions regarding the efficacy of treatment must always be guarded, since numerous recoveries have been seen when no special therapy was used. The usefulness of adequate diet and yeast in the prevention of pellagra and the cure of mild cases cannot be questioned. Their failure to rescue a large proportion of the severely ill is equally certain; this therapeutic paradox has been the great obstacle to the unqualified acceptance of Goldberger's theory of vitamin B_2 deficiency. Spies,[4] however, was able to secure spectacular remission by the use of very large amounts of autoclaved yeast while withholding all other food. The quantity of yeast used furnished a diet of low nutritive value, but containing a vast amount

of vitamin B_2. Following the discovery of the curative properties of liver in pernicious anemia, several observers who had long been impressed by the analogies between this disease and pellagra, experimented with liver therapy. Boggs and Padget[10] secured excellent results from liver feeding; Ramsdell and Magness,[11] Ruffin and Smith,[12] Spies[13] and others had marked success with liver extracts administered orally and parenterally. In carefully controlled patients kept on pellagra producing diets liver extracts caused much more rapid and certain cure than yeast. Pursuing the similarity of pernicious anemia and pellagra, Spies[9] tested the efficacy of dried stomach mucosa and with large amounts secured excellent remissions. Goldberger and Sebrell[14] had already noted the curative value of liver extract in blacktongue and attributed its curative properties to the large amount of vitamin B_2 present. Since whole liver and dried stomach mucosa also contain relatively large amounts of vitamin B_2, many have thought that the vitamin content alone was sufficient to explain the anti-pellagrous potency of this group of substances. It is noteworthy, however, that liver, liver extract and dried stomach mucosa are all more rapidly effective than yeast and in many instances have produced remission or cure in apparently hopelessly advanced pellagra. It seems necessary to explain this increased therapeutic effect.

Following Castle's demonstration of the nature of the essential hemopoietic substance of liver it seemed important to investigate the matter of an intrinsic defect in pellagra. Boggs and Padget[10] and Spies[15] had already suggested such a defect. Accepting the probability that an essential extrinsic substance exists in the vitamin B_2 complex, the plan of the experiment was to maintain patients with active rather severe pellagra on a pellagra producing diet and to try the efficacy of normal gastric juice as a source of hypothetical intrinsic factor.[16] It was thought that the diet, though extremely poor in B_2, would furnish a sufficient amount of this vitamin to cause improvement in the presence of an adequate supply of any complementary substance in gastric juice. The diet was more abundant and of higher caloric value than that which the patients had been existing on at home. A small group of patients with severe pellagra, growing worse on the test diet, were subjected to the experiment. Of six patients who had no treatment other than gastric juice, five recovered quite promptly, one died of an acute intercurrent infection. Others were given gastric juice in conjunction with other therapy, but are not considered here. Those patients who secured remission were kept on the test diet for periods ranging from three weeks to three months without relapse; three are known to be well eighteen months to three years later. One relapsed a year after treatment and recovered again under different therapy; one has been lost from observation. This experiment led us to believe that normal gastric juice does contain a substance which is essential to the cure of pellagra and that the prolonged remissions with failure to relapse on test diet indicate the storage of an essential curative substance in the patients' bodies. If the analogy to pernicious anemia and sprue is followed, the liver should be the reservoir.

These observations, together with the results of liver and stomach mucosa therapy, the frequent recovery of mild pellagra on pellagra producing diet and the frequent failure of yeast therapy, seem to make it possible to formulate a theory of the etiology of the disease which can explain most of its phenomena. It is suggested that pellagra is a conditioned deficiency of the same order as pernicious anemia and sprue, but more complex than either. The essential curative substance is produced by the interaction of an intrinsic factor present in normal gastric juice (and perhaps in the gastric juice and stomach of animals) with certain components of the vitamin B_2 complex. This essential substance is probably stored in the liver. Absence of the intrinsic factor and exhaustion of the stored essential substance result in the symptom-complex of pellagra.

The intrinsic defect may be the result of prolonged deprivation of the extrinsic factor or from chronic disturbance of gastric secretory function from other causes. At times it may be constitutional. Absence of the intrinsic factor is frequently but not necessarily associated with achlorhydria. The intrinsic factor is probably distinct from that of pernicious anemia. Spies and Payne[17] and Saleh[18] have shown that the achlorhydric gastric juice of pellagrins contains the intrinsic factor of Castle. Also, the hemopoietic disturbance in pellagra apparently has nothing in common with pernicious anemia; anemia is almost always of hypochromic type; changes in the bone marrow are not distinctive and there is no significant reticulocyte response to liver, stomach mucosa, yeast or gastric juice therapy. The intrinsic defect may exist in varying degrees. If the stomach remains capable of secreting even small amounts of intrinsic factor

and the liver is not severely damaged very small amounts of extrinsic factor can be utilized. Such conditions offer an explanation of recovery on pellagra producing diet which can never be entirely free of vitamin B_2. If the stomach has ceased to secrete intrinsic factor, but retains the capacity so to do and the liver is intact, the administration of large amounts of extrinsic factor may stimulate the secretion of adequate amounts of intrinsic factor. This perhaps is the mechanism of recovery under yeast therapy. When gastric function is totally exhausted, whether or not the liver is undamaged, extrinsic factor cannot be utilized, but substitution therapy with both factors or with preformed essential substance may cause recovery. If this be true it explains the action of liver and liver extract, which we believe contain the complete curative substance; of ventriculin, which contains both factors, possibly already combined; and of gastric juice. In the last instance large amounts of intrinsic factor apparently make minimal quantities of extrinsic factor available.

We have constantly used the terms extrinsic factor and vitamin B_2 interchangeably. It seems certain that the extrinsic factor is one or more of the constituents of the B_2 complex and is available from any substance containing this group of vitamins. That it is not flavin has been shown by Dann, Ruffin and Smith.[19]

The theory outlined can account for the occurrence of pellagra under varying conditions. The prolonged use of diet exceedingly low in the extrinsic factor results in failure of gastric secretory function and eventual disappearance of intrinsic factor, and with this there is exhaustion of stored essential substance. In the occasional instances where pellagra develops in individuals known to be adequately fed we believe that there is absence of the secretion of intrinsic factor either as a constitutional defect or as the result of malignant or degenerative disease of the stomach. It is possible also that extensive disease of the liver with failure of storage of essential substance is important. Pellagra subsequent to chronic alcoholism is probably due to inadequate gastric secretion and fatty degeneration of the liver rather than inadequate dietary, though the latter may often be an added factor. Intoxicants other than alcohol and many types of chronic infection result in failure of gastric function and in hepatic damage. In short, we believe that any agent which seriously damages the gastric secretory function over a considerable period of time may cause pellagra by failure of the intrinsic factor. If liver damage is added, the disease is rendered more severe.

The relation of sunlight to the pellagrous eruption may well depend on a defect in the metabolism of hemoglobin or an undetermined disturbance of the hemopoietic system. Almost simultaneous observations by Bassi,[20] Ellenger and Dojemi[21] and Brown[22] showed marked porphyrinuria during the acute phase of pellagra. Brown found that hematoporphyrin disappeared as the patient's condition improved. Whether hematoporphyrin accumulates in pellagra with a normal rate of erythrocyte destruction or whether there is increased hemolysis is not yet known. It seems probable that photosensitization by poryphyrins may be an important factor in pellagrous dermatitis. It is remotely possible that certain of the gastro-intestinal and neurological findings may also depend on hematoporphyrinemia. It is possible also that this phase of pellagra is related to the gross hemapoietic disturbances of pernicious anemia and sprue.

SUMMARY AND CONCLUSIONS

No current theory of the etiology of pellagra satisfies all requirements.

The hypothesis is advanced of an intrinsic deficiency, analogous to but distinct from that of pernicious anemia and sprue.

The intrinsic factor is believed to be present in normal gastric juice.

The extrinsic factor is probably contained in the vitamin B_2 complex.

Hematoporphyrinuria has been noted during the acute stages of pellagra. It is suggested that the characteristic dermatitis is due to photosensitization by this substance.

Most of the phenomena of pellagra can be explained by the theory presented.

REFERENCES

1. Barnes, J. M.: Typical Pellagra Syndrome Developing in Patient with Chronic Ulcerative Colitis While Under Hospital Treatment. Ann. Clin. Med., **4**:552, 1926.
2. Spies, T. D.: Pellagra: Improvement While Taking So-Called "Pellagra Producing Diet." Amer. Jour. Med. Sci., **184**:837, 1932.
3. Spies, T. D.: The Etiology of Pellagra: Response to a Deficient Diet. Sou. Med. & Surg., **95**:128, 1932.
4. Authors' unpublished observations.
5. Sabry, I.: Cited by Meakins, J. C.: The Practice of Medicine, p. 732. St. Louis: The C. V. Mosby Co., 1936.
6. Copping, A. M.: Flavin and Vitamin B_6 in Cereals. Biochem. Jour., **30**:849, 1936.
7. Berondes, R. de R.: Selenium Toxicosis: The Etiologic or Causative Factor in Pellagra. Amer. Jour. Digestive Dis. & Nutr., **3**:330, 1936.
8. Tucker, B. R.: The Neuropathology of Pellagra in Its Relation to the Cutaneous and Other Manifestations. Sou. Med. Jour., **28**:603, 1935.

9. Spies, T. D.: Observations on the Treatment of Pellagra. Jour. Clin. Investigation, **13**:807, 1934.
10. Boggs, T. R.; and Padget, P.: Pellagra: Analysis of 102 Cases. Bull. Johns Hopkins Hosp., **50**:21, 1932.
11. Ramsdell, R. L.; and Magness, W. H.: Parenteral Liver Therapy in the Treatment of Pellagra. Amer. Jour. Med. Sci., **185**:568, 1933.
12. Ruffin, J. M.; and Smith, D. T.: The Treatment of Pellagra with Certain Preparations of Liver. Amer. Jour. Med. Sci., **187**:512, 1934.
13. Spies, T. D.: The Treatment of Pellagra by Means of Parenteral Liver Extract. Proc. Soc. Exp. Biol. & Med., **31**: 363, 1933.
14. Goldberger, J.; and Sebrell, W. H.: The Black Tongue Preventive Value of Minot's Liver Extract. U. S. Pub. Health Rep., **45**:3064, 1930.
15. Spies, T. D.; Payne, W.; and Chinn, A. B.: The Relationship of Pellagra to Pernicious Anemia. Proc. Soc. Exp. Biol. & Med., **32**:328, 1934.
16. Sydenstricker, V. P.; Armstrong, E. S.; Derrick, C. J.; and Kemp, P. S.: On the Existence of an Intrinsic Deficiency in Pellagra. Amer. Jour. Med. Sci., **192**:1, 1936.
17. Spies, T. D.; and Payne, W.: A Study of the Etiologic Relationship Between Pellagra and Pernicious Anemia. Jour. Clin. Investigation, **12**:229, 1933.
18. Saleh, M.: Demonstration of Hemopoietic Principle in Chronic Pellagric Achlorhydria. Trans. Roy. Soc. Trop. Med. & Hyg., **29**:299, 1935.
19. Dann, W. J.; Ruffin, J. M.; and Smith, D. T., cited by Birch, T. W.; Gyorgy, P.; and Harris, L. J.: Biochem. Jour., **29**:2850, 1935.
20. Bassi, U.: La porfirine nella patogenesi della pellagra. Clin. Med. Ital., **65**:241, 1934.
21. Ellenger, P.; and Dojemi, L.: Note on the Presence of Porphyrin in the Urine of Pellagra Patients. Jour. Soc. Chem. Ind., **54**:507, 1935.
22. Brown, W. R.: Personal communication.

DISCUSSION (*Abstract*)

Dr. Leon S. Lippincott, Vicksburg, Miss.—It has been rather generally agreed that pellagra is a so-called deficiency disease, but that certain cases do not improve on the most liberal diets containing abundant vitamins. The necessity for another "intrinsic factor," which could well be produced in the stomach, seems to be borne out by numerous reports of pellagra's developing coincidently with various new growths and destructive and inflammatory lesions of that organ, in all of which the "intrinsic factor" might not be produced or, if produced, would be lost.

Also the frequently reported liver lesions accompanying pellagra might well point to storage of the "intrinsic factor" in the liver. We do know that certain liver extracts are definitely beneficial in the treatment of pellagra and this would seem to indicate that the "intrinsic factor" is produced in animals as well as in human beings.

It is interesting to note that hydrochloric acid has been rather generally used in the treatment of pellagra because the stomach acid is usually low in these patients. It would now appear that the low acid is only a part of a disease process in the stomach which is instrumental in producing pellagra.

The work of Spies on the dermatitis of pellagra seems to indicate that sunlight is not the chief factor. He was unable to produce the skin lesions by ultraviolet radiation or direct sunlight and was able to produce them by deficiency diets in patients kept from exposure to direct sunlight. His conclusions that sunlight may serve as an irritant and precipitate skin lesions, but that the skin lesions are probably the local reaction to a systemic disease seem likely to prove correct.

The fact that chronic alcoholism is a frequent finding in pellagrins seems to support the work of Drs. Sydenstricker and Thomas through the possible effect of alcohol on the stomach itself and its effects on the appetite and the utilization of food ingested. It is significant that alcoholic neuritis is also relieved by vitamin therapy.

There is much more work to be done, including chemical studies of foods and of soils on which foods are grown, as suggested by Berondes, who thinks that selenium toxicosis may be a factor in pellagra. At present we are likely to get good results by following the suggestions of Drs. Sydenstricker and Thomas.

TREATMENT OF ENDEMIC PELLAGRA*

By TOM DOUGLAS SPIES, M.D.
Cincinnati, Ohio,
AUSTIN CHINN, M.D.
Washington, District of Columbia,
and
JAMES B. MCLESTER, M.D.
Birmingham, Alabama

In spite of an active interest in endemic pellagra for thirty years, Southern physicians have been unable to affect the ultimate outcome of severe cases. There has been a consistent death rate of one in two to four hospitalized cases. We are reporting results from an endemic area with a regime which has reduced this mortality to a much lower figure.

Treatment was put on a rational basis when Goldberger, in 1916 and 1920, demonstrated that the absence of certain factors from the diet played at least a major role in the causation of the disease. He reduced the frequency of occurrence of pellagra by adding certain foods to a presumably causative deficient diet. The so-called pellagra-preventive factor was found to be present in large quantities in liver and yeast. Many drugs have been suggested, arsenic in various forms, iron, and hydrochloric acid enjoying the greatest favor, but with little effect in severe cases. In spite of diets constructed according to Goldberger's suggestions with moderate re-enforcement by liver and yeast, and in spite of drug therapy, there has been little appreciable reduction in the mortality of advanced cases.

In the sixteen years, 1920 through 1935, there were 58 deaths, or about 32 per cent of the 183 pellagrins admitted to the wards of the Hillman Hospital in Birmingham, and yet these

*Read in Section on Medicine, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

patients received more of the so-called pellagra-preventive substance than is contained in the normal well balanced diet. This death rate was consistent up through the last years of the period. This high mortality, in spite of use of the then accepted treatment, stimulated a paper by J. S. McLester in 1934, in which he expressed the opinion that our knowledge of the disease and its treatment was inadequate.

In 1935, Spies reported the reduction of mortality in severely diseased pellagrins from a former 54 per cent to 6 per cent in a series of 125 cases. These cases consisted largely of alcoholics with pellagra and patients with the disease secondary to other organic conditions. For this reason and as they were in Ohio, where the disease is not endemic, it was felt that a similar series in the South, where it is endemic, would be of interest. Accordingly, beginning early in 1936, the methods used by Spies were applied at the Hillman Hospital in Birmingham. We herewith report our results for the first six months of the year.

No change was made in Spies' therapeutic procedure. It consisted, in brief, in complete bed rest, a very high caloric, high protein diet with much larger quantities of brewer's yeast, liver and other pellagra-preventive material than had been used heretofore. Careful and frequent attention by the physician was considered essential to change details of treatment promptly to meet varying conditions, to see that the rather arduous regime was carried out and carefully to evaluate the effect of the treatment.

Each patient remained in bed until his condition warranted giving him greater freedom. Sedatives and adequate nursing care made this less irksome. On several occasions it was noted that when, against advice, a very ill patient got up to go to the toilet he was worse within a few hours. Mild mental symptoms were the source of some lack of cooperation in this regard. Special nursing or special attention by general duty nurses was necessary to assure complete bed rest and cooperation in other features of the treatment.

Brewer's yeast was used as the specific therapeutic agent in those patients who were not vomiting or in whom the diarrhea was not severe. It was usually given in one ounce (30 gram) doses mixed in ice-cold eggnog three or more times daily. Larger doses, two or even three ounces, three times daily were sometimes used. When gastro-intestinal disturbances, vomiting or diarrhea prevented the alimentary absorption of yeast, liver extract was given intravenously in the severest cases, intramuscularly in others. When the injectable liver extract could be obtained it was given every two or three hours until a response was noted and then less often until yeast could be taken by mouth. Control of diarrhea with paregoric and bismuth often allowed the otherwise ineffective oral use of yeast. When diarrhea or vomiting were made worse by yeast, the more frequent use of smaller amounts was occasionally found to be less upsetting. Raw ground liver mixed with tomato juice was used in a few cases. Wheat germ and desiccated hog stomach were not used in this series.

Great stress was laid on the patients' food. When possible they took four to five thousand calories daily. A large fraction of this, 125 to 150 grams, was in the form of protein, preferably of animal origin. The diet was given in six or more feedings daily. Patients who found it difficult to eat such quantities were fed smaller amounts more often and given more personal attention. The pellagrin with anorexia could be made to eat more if some one stayed with him and coaxed until the food was taken. Many calories and grams of protein were given in the form of eggnogs with the nurse or doctor holding the glass when it would have remained on the bedside table if there had been less personal attention. Food lost through vomiting or diarrhea was estimated and replaced when possible. Large doses of the specific therapeutic agents gave an appetite so that this dietary regime became less difficult as the patient improved.

No routine of treatment could be followed. Each patient had to be considered separately and the best method whereby these unusual quantities of food and yeast or liver could be given was utilized. Each patient, ill enough to be hospitalized, was considered as an emergency and any change for the worse or any failure to take and retain the specified food or other material was the signal for redoubled efforts. Mental symptoms called for extreme measures to get these materials into the patient, both because of lack of cooperation and because of a more doubtful prognosis.

This was the principal portion of the treatment. Other therapy was symptomatic: mouth washes for the stomatitis, opium for abdominal pain, opium and bismuth for diarrhea, and soothing and softening agents for the skin. A 1:5000 solution of potassium permanganate was used in soaks or wet dressings when the skin

lesions were secondarily infected. The anemia was treated by iron only after the patient had shown considerable improvement. A few were given transfusions. All of these symptoms were considered to be of secondary importance.

The difference between this regime and that previously followed in the same hospital is quantitative rather than qualitative. The patients in the past were put on the regular house diet of two thousand to twenty-five hundred calories, with no unusual efforts to make them eat, instead of the four thousand calories or more used in this series, where they were strongly urged to eat. With severe stomatitis and glossitis they usually had had in the past the regular soft or liquid diet which probably contained less than the maintenance caloric requirement. They were given yeast in one dram (4 gram) doses three times daily rather than in ounce (30 gram) or larger doses equally often. Liver had been given once daily as an article of diet or occasionally as liver pulp with tomato juice. If given parenterally it had been in small doses two or three times weekly rather than several times daily as we found necessary in the sickest patients. No new therapeutic agents have been introduced. The older ones have been used in larger quantities and the patients' symptoms have not been allowed to prevent the adequate treatment of the disease.

Seventy-three patients were discharged from the hospital with the diagnosis of pellagra in the first six months of 1936. Most of these were severe endemic pellagrins. In some the pellagra was associated with other organic disease. Even though the pellagra was mild in some of these, they were included in this series. A very few gave a history of alcoholism. There were five deaths, giving a mortality of 6.8 per cent as compared with the consistent 31.7 per cent for the preceding sixteen years. The cases of 1936 may not be strictly comparable with those of previous years because when it became known that we were specially interested in the disease, larger numbers of patients were sent to us and it is possible that a smaller number of them were dangerously ill. It is difficult to express the comparative severity of disease in groups of patients. In our series we used these criteria. Any pellagrin in poor general condition was considered dangerously ill with one or more of these manifestations: mental symptoms, persistent vomiting, intractable diarrhea, an unexplained elevation of temperature to over 102°, a pulse rate of more than 120 with the patient at rest, or stomatitis so severe that he did not want to eat. All of our patients admitted solely because of their pellagra were very ill by these criteria. A few were admitted for other diseases and found to have pellagra also. The seventy-three hospitalized pellagrins constituting this series included a number who were extremely ill and who would have died, we feel sure, if they had not been treated.

Forty-seven of the seventy-three cases were treated by Spies, Chinn, and their technical help imported from Ohio. Twenty-six were treated by the regular staff at the Hillman Hospital, using the same methods with comparable results. The regular staff physicians saw and assisted in the treatment of all patients.

Of the five deaths, but one can be said to be definitely due to pellagra. That patient came to the hospital at a time when no parenteral liver extract was available. On liver and yeast by mouth and forced feedings she improved at first, but then went downhill and died. She also had granuloma inguinale and chronic vascular nephritis. A second death was caused by a pulmonary embolus from a thrombo-phlebitis of the hemorrhoidal veins. There was also a chronic inflammatory stricture of the rectum. The relation of these to the pellagra is questionable; they may be secondary to it. The third patient also died of a pulmonary embolus, this one arising from abdominal vessels about a postoperative fecal fistula. This was not a pellagra death. A fourth patient had had a hemorrhoidectomy. While in the hospital she developed pellagra which was improving when she died. She also had salpingitis and luetic aortitis. We do not feel that she died of pellagra. In these last three, the pellagra manifestations showed definite improvement under treatment. A fifth patient that died had very extensive pulmonary tuberculosis. Death in this case also was not considered to be due to pellagra. It is possible that the pellagra, by complicating the primary cause, played a part in all of the deaths. These five were the only deaths in our seventy-three cases.

Of the sixty-eight patients discharged living, all were markedly improved. Most of them showed definite change in stomatitis, glossitis, appetite and general feeling tone within twenty-four hours or less. Vomiting responded fairly quickly. Skin lesions and the need for opiates to control the diarrhea improved more slowly,

but usually within a few days. Neurological and mental manifestations required a longer time and the anemia rarely responded while the patient was in the hospital. The rapid response to treatment was very striking. It is the thing that makes us feel that this form of therapy is of real benefit. With older methods the patients improved very gradually; the patients in this series usually showed a definitely favorable change within twenty-four hours after treatment was begun.

This rapid improvement is expressed in the length of hospitalization. In our present series, the average period of hospitalization was 12.7 days for those who lived. Half of them were on the ward ten days or less. The longest for any of them on treatment was 42 days. The average stay of patients discharged alive in the past sixteen years was 29 days. The average for the past two years was also 29 days. No patient in the past two years was discharged before the twelfth day and one was in the hospital 106 days.

There has been insufficient time to judge permanence of cure or frequency of recurrence.

A larger number of milder pellagrins were also treated without hospitalization. They were given advice similar to the hospital treatment with similar striking improvement. A few of them subsequently required hospitalization, but as there was no check on their cooperation we cannot statistically compare results. Suffice it to say that we feel that treatment of the mild pellagrin will produce a remission in all uncomplicated cases.

In summary, we have applied the methods of treatment previously outlined by Spies to seventy-three severe cases of pellagra in an endemic area with a mortality of 7 per cent, as compared with a previous 32 per cent. One of the patients who died did not receive all of the recommended treatment. One died from causes possibly secondary to pellagra, and the others were thought to have died of other conditions, possibly complicated by pellagra. Sixty-eight cases showed definite rapid improvement and were discharged from the hospital in a much shorter time than had been required in previous years.

The method of treatment consisted in bed rest, careful nursing care and special attention, high caloric, high protein diets together with very large quantities of specific pellagra preventive substances, yeast and liver in this series. The difference between treatment of these patients and those previously seen has been quantitative rather than qualitative.

We hesitate to draw definite conclusions from this series or its comparison with previous patients in the same hospital. It does, however, seem quite probable that these methods, if conscientiously applied to endemic pellagra, will produce results comparable to those previously demonstrated in pellagra in a non-endemic area.

DISCUSSION (*Abstract*)

Dr. James E. Paullin, Atlanta, Ga.—Endemic pellagra has attracted the attention of physicians in various parts of this country for many years. This disease has presented for solution many intriguing problems and while very little advance has been made since the work of Goldberger and his associates in determining more definitely the causative factor or factors, great improvement has been made by numerous workers in perfecting curative treatments.

The paper which has just been read is a definite contribution toward this end. The observations which have been made by careful and painstaking workers definitely show that even those seriously ill with pellagra, who a few years ago would have died as a result of this malady, can now be restored to at least a temporary state of well-being with more intensive treatment.

Shortly after the publication of Goldberger's observations on pellagra, and at the time when the disease was more prevalent than now, it was observed that many pellagrins in our wards who were seriously ill with an intractable diarrhea would not respond to the high vitamin diet advocated by Goldberger. As a result of this situation, many therapeutic procedures were instituted, but unfortunately without any great amount of relief to the sufferers from this disease, and during these years the mortality continued at about the same level.

The observations of Smith, Spies and others that liver therapy was of value in reducing the mortality from pellagra and that it was useful in ameliorating the symptoms of this disease was a considerable step forward. The perfection of liver extract which could be given parenterally further simplified the problem of treatment, so that today, as has been demonstrated by the use of this remedy in adequate doses, great good can be accomplished in treating patients and hospitalization can be greatly shortened. In the medical clinic of the Emory University Division of Grady Hospital, evidence in support of the claims of Dr. McLester and his coworkers is amply available.

From the observations which have been made by those who have devoted many years of research to this problem and those who have spoken on this program today, it would seem that we might be justified in assuming that endemic pellagra begins as a deficiency disease, as an avitaminosis. With the existence of this state of avitaminosis over a period of time, there develops another factor. The development of this factor, if we are allowed to draw analogies from other diseases, such

as pernicious anemia, is dependent on unknown causes. When this intrinsic factor is absent in a considerable quantity, we have severe infection. As to whether recovery will take place or not depends on whether the factor can be supplied in sufficient amount and at an early enough time in the disease to be efficacious. A discussion of the mechanism involved in such recovery would lead us quite far afield into a speculative realm which would do no good; however, we are happy to see from the results which have been accomplished with these new therapeutic procedures, the progress of sound thinking.

Dr. W. H. Sebrell, Washington, D. C.—This paper very forcibly brings to my mind a point about the treatment of pellagra which Goldberger always emphasized, which was this: that it is not the diet that is prescribed for the patient that counts, but what the patient actually eats, or in other words, one's success in treating pellagra is proportional to the personal attention devoted to the proper feeding of the individual patient. Drs. Spies, Chinn and McLester are to be complimented in their effective demonstration of the excellent therapeutic results which can be obtained even in the severest cases of pellagra with active, intensive dietary treatment, although the lack of parallel controls, as the authors have pointed out, makes one a little hesitant about drawing definite conclusions in regard to the effect of their treatment on the death rate.

One of the most important points brought out in this paper is the necessity for close observation and individual attention to the patient. Due to the lesions in the mouth, the gastro-intestinal symptoms, and sometimes the mental symptoms, the pellagra patient will not eat the full diet prescribed and unless carefully taken care of and fed under supervision the physician may be misled into thinking his dietary treatment a failure through the patient's failure to eat the prescribed food.

In general, the course of treatment given here follows and extends that proposed originally by Goldberger, which has been advocated by the United States Public Health Service for the past several years. The new features which Drs. Spies, Chinn and McLester introduce are the use of liver extract parenterally in cases with severe gastro-intestinal disturbances, a more liberal diet, and larger doses of dried yeast. Our recommendations have been 3,000 calories and ½ to 1 ounce of yeast daily. Drs. Spies, Chinn and McLester gave 4,000 to 5,000 calories daily with 1 ounce doses of yeast three or more times a day, and sometimes 2 or even 3 ounces three times daily. I want particularly to direct your attention to these relatively enormous doses of dried yeast, 3 to 9 ounces daily. I think many of the failures in treating cases of pellagra can be laid to insufficient doses of yeast. You can readily see that it is practically out of the question to give such large doses with moist yeast or with compressed yeast tablets. There is no evidence that large doses of dried yeast are harmful so there is no need to fear giving too much. On the other hand, smaller doses may not be effective, particularly if the diet is not under close supervision.

Somewhat the same situation exists in regard to the parenteral administration of liver extract. If it is used at all it should be given as Spies has recommended, in large doses at frequent intervals until improvement is noted. Since the antipernicious anemia value of a liver extract does not appear to be a measure of its pellagra preventive value, one should not be misled into attempting to evaluate a liver extract for pellagra on this basis. The principal value of parenteral liver extract seems to be in the far advanced cases of pellagra where the patient is in very bad condition or when vomiting or diarrhea makes adequate food retention and assimilation difficult or impossible. In these cases, liver extract has a real place and its use in liberal doses will probably save lives. In the milder cases treatment with adequate amounts of yeast and a liberal diet of foods rich in the pellagra preventive factor is usually sufficient, although in these cases liver extract by mouth may also be of considerable value.

It is unfortunate that the authors could not give us more detail about the changes which were made in the diets of their patients. While it is necessary to keep up the caloric value of the diet in order to maintain the patient, the principal value of the very large amount of food used here is in the quantity of the pellagra preventive factor carried in these foods. The Public Health Service has determined the pellagra preventive value of most of the foods commonly used in the South, and in general terms the foods which should be added to the diet are lean meats, liver, fish, milk and green, leafy vegetables. While our experimental work indicates that the vegetables contain relatively small amounts of the pellagra preventive factor, the quantities in which they can be obtained and in which they are usually used make them of value. Since it is necessary to devote considerable attention to the diet in pellagra, it is usually a simple matter to make it up largely of foods which contain the pellagra preventive factor. In this connection, it is perhaps well to stress the point that after the patient's symptoms have subsided under this careful hospital regime, if he is permitted to return to his former diet on which he developed pellagra, he will sooner or later suffer a recurrence. Therefore, from the viewpoint of preventive medicine, it is essential that the patient be educated to appreciate the necessity of continuing the use of the proper foods if he is to remain in good health.

In this connection, I thought you might be interested in the figures on the deaths from pellagra in the United States in the past few years. About 90 per cent of these deaths occur in the Southern States. In 1930 there were 7,146 deaths from pellagra reported to the United States Public Health Service; in 1931, 5,853; 1932, 4,134; 1933, 3,821; 1934, 3,602; 1935, 3,438. This steady and marked decrease is due to the more liberal diet which has resulted during the depression years from crop diversification, more home gardens and livestock, relief funds, and, to some extent we hope, from better and more widespread treatment of cases by dietary measures. There is no reason why any hospital in the South should not be able to duplicate the excellent results reported here by Drs. Spies, Chinn and McLester.

PREFRONTAL LOBOTOMY IN THE TREATMENT OF MENTAL DISORDERS*

By WALTER FREEMAN, M.D., PH.D., F.A.C.P.
and
JAMES W. WATTS, M.D.
Washington, D. C.

The operation of prefrontal lobotomy in the treatment of certain of the psychoses was introduced by Egas Moniz,[1] of Lisbon, somewhat less than a year ago. The procedure had suggested itself to others, but was considered too daring for serious consideration until more was known about the functions of the frontal lobe and the possible bad results to be encountered from their injury. A long series of studies, dating back to the famous crow-bar case[2] supported by the experimental findings of Fulton and Jacobsen[3] and climaxed by the cases of bilateral prefrontal extirpation of Brickner[4] and of Ackerly[5] led to a trial of the procedure in the treatment of certain psychoses.

Moniz reported his preliminary results early this year in a monograph covering his first twenty cases. Proceeding cautiously, first by injections of alcohol into certain parts of both frontal lobes and later by section of the subcortical white matter by means of a leucotome, he has come now on the basis of another score of operations, to the more effective procedure of making six spherical cuts about 10 mm. in diameter beneath the medial and lateral surfaces of each prefrontal area.

This procedure has been followed by us in six cases during the past two months, and we are able to report in very tentative fashion our results to date. We are able to say, with Moniz, that no patient has died and none has been made worse. All of our patients except one have returned home, and some of them are no longer in need of nursing care. All of them are more comfortable, having been relieved of certain symptoms that previously had been very troublesome. It is as if the "sting" of the psychosis had been drawn. It is much too soon to say that they have been permanently relieved of their symptoms, and we do not wish even to mention the word cure. Furthermore, these patients have not been subjected as yet to any of the finer psychological tests for delayed response, imagination, and constructive ability, tests that might elicit finer degrees of deficit due to the lesions produced in the frontal lobes. One of our patients has returned to her former job.

The findings reported at this time, therefore, must be considered as those following immediately upon the operation, and we do not desire to forecast the future for these patients, except that we have some evidence from the reported cases of Brickner and of Ackerly that the alterations tend to be rather stable when estimated repeatedly over a period of months or years.

Prefrontal lobotomy has been performed in our cases as a means for relief of symptoms in patients who were more or less disabled as a result of certain mental states that had proven refractory to conservative methods of handling. In all of our patients there was a substratum, a common denominator of worry, apprehension, anxiety, insomnia and nervous tension, and in all of them these particular symptoms have been relieved to a greater or lesser extent. In some patients there has been amelioration or even disappearance of certain other symptoms such as disorientation, confusion, phobias, hallucinations, and delusions that were present before operation. The physical condition of our patients has also improved, and the visceral symptoms have tended to subside. Certain neurological symptoms such as perseveration of speech, increase of reflexes, and disturbance of vesical control which developed immediately following operation in several patients, disappeared within a few days, and we have observed no pupillary disturbances, no ataxia and no paralysis.

TECHNIC

The preparation of the patient and the technic of operation described by Moniz has been followed in detail. Cleansing enemas are given the previous evening and 80 to 85 mg. per kilogram of body weight of tribromethyl alcohol are given in the patient's room half an hour before the operation. Tribromethyl alcohol is supplemented with local or gas as seems desirable. After the patient reaches the operating room the hair is shaved back as far as a vertical plane passing through the external auditory meatus, and the skin is prepared by scrubbing with soap and water, ether, iodine and alcohol. The medial longitudinal line and the location

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Neurology, George Washington University Hospital, Washington, D. C.

of the incisions are indicated with gentian violet. A burr hole is placed over each frontal lobe 3 cm. lateral to the midline in a vertical plane which passes 3 cm. anterior to the external auditory meatus. Scalp incisions 3 cm. long are made parallel to the midline and bleeding is controlled with mastoid self-retaining retractors. It is important that the periosteum be incised so that the holes can be located properly. It has been found desirable to make both scalp incisions before placing the retractors, as the landmarks are easily displaced. Burr holes are made and the dura and pia-arachnoid are carefully incised to avoid troublesome bleeding.

The leucotome or lobotomy cannula *(Fig. 1)* is inserted in the anteromedial direction to a depth of 4 cm. below the surface of the cortex. The stylet is pressed in, forming a loop near the distal end of the instrument. The leucotome is rotated through one complete circle, cutting a sphere or "core" of white matter in the prefrontal area *(Fig. 2)* about 10 mm. in diameter. The stylet is withdrawn a few mm., thus replacing the loop within the cannula. A second "core" is cut at a depth of 3 cm., and a third at 2 cm. The leucotome is then entirely removed from the brain and reintroduced in an anterolateral direction into the same prefrontal lobe where "cores" are cut at a depth of 4.5 cm., 3.5 cm., and 2.5 cm. In like manner 6 spherical cuts or "cores" are made in the other frontal lobe. In the most recent case after performing the subcortical lobotomy and withdrawing the leucotome a brain cannula was inserted along the needle tract and a small quantity of thorium dioxide injected in order to visualize the site of the "cores" *(Fig. 3)*. The incisions are closed with a layer of interrupted black silk sutures in the galea and a layer in the skin.

Our patients are put to bed in a semi-Fowler position. Fluids are given by mouth as soon as tolerated, but are limited to 1000 c. c. in 24 hours. Soft diet is started on the second postoperative day and they are allowed to sit up in a chair on the third or fourth day and walk about the hospital corridors a day or two later. The patients are usually discharged from the hospital between one and two weeks after operation.

At no time during or after the operation in our six cases have we noted any shock or respiratory embarrassment, and the pulse and blood pressure have been maintained at a normal level. The condition of the patients after operation has been all that could be desired. During the two or three days following operation there has been a rise of temperature of, at most, three degrees, with prompt subsidence.

In only one case thus far did a complication develop, apparently due to making the incision

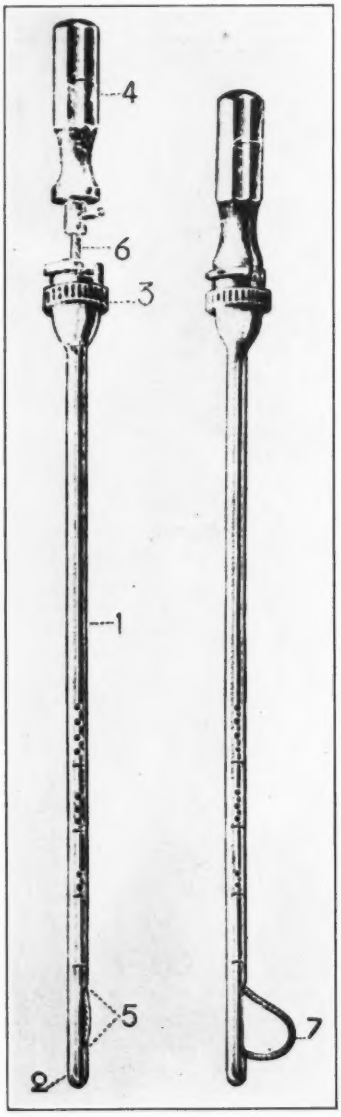


Fig. 1
The Moniz leucotome or lobotomy cannula; pushing in the stylet forms the cutting loop near the distal end.

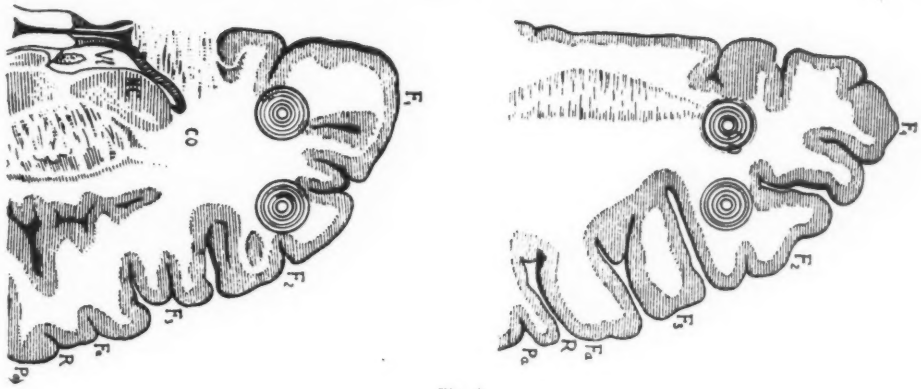


Fig. 2
Sketch of location of the "cores" of subcortical white matter cut by the leucotome. (After Moniz)

too close to the cortex and lacerating a vessel. After six days the patient became very confused and aphasic, but the condition improved notably in two days, and after a period of perseveration of speech, this patient proceeded satisfactorily toward recovery and eventual discharge *(Case 1)*.

REPORT OF CASES

Case 1.—The chief complaints of Mrs. A. H., aged 63,* were nervousness, insomnia, depression of spirits, anxiety and insecurity, getting progressively worse for a year. She had always been high-strung, emotional, and easily fatigued, a meticulous housekeeper with several previous nervous breakdowns. For ten years she had taken sedatives in order to sleep. She was unable to adjust herself to the idea of growing old, became progressively more agitated, tense and emotional; for instance, when she was asked about colds or sore throat she became agitated, saying, "Why do you want to know? Why do you ask me that? What does that mean? What has that got to do with it?" During the examination she was wringing her hands, moving about in bed, and trying to get out.

Prefrontal lobotomy was carried out on September 14, 1936, using the technic described by Moniz. In making the third anterolateral section on the right side some bleeding was encountered and a small vessel was found adherent to the leucotome when withdrawn.

Four hours later she greeted the physician in a calm voice, holding out her hand and declaring that she felt much better. The next day the following conversation was carried out:

D.: "Do you have any of your old fears?"

P.: "No."

D.: "What were you afraid of?"

P.: "I don't know. I seem to forget."

D.: "Do you remember being upset when you came here?"

P.: "Yes, I was quite upset, wasn't I?"

D.: "What was it all about?"

P.: "I don't know. I seem to have forgotten. It doesn't seem important now."

The patient had a setback on September 20, when she became restless, confused, showed perseveration in speech, and finally aphasia, and showed some rubbing and rolling movements. Her expression was serene, however, and this phase passed off fairly rapidly.

She was discharged from the hospital about eighteen days after operation.

When seen recently she stated that her anxiety and apprehension were no longer present, that she could sit down and plan out a course of procedure better than she could before because of freedom from distraction; that she was content to grow old gracefully and

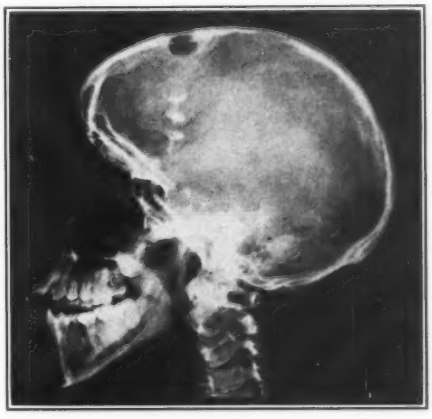


Fig. 3
Lateral roentgenogram of the head (Case 6) after lobotomy, the "cores" being visualized by the injection of thorium dioxide.

*This case has been reported *in extenso* by Freeman and Watts, Medical Annals, District of Columbia, 5:326 (Nov.) 1936.

that she could enjoy external events more than she could before because she was not always impelled to be on the go herself. She managed the apartment and kept the household accounts as well as she ever did; enjoyed rides in the automobile and the company of friends who formerly used to exhaust her. She slept well at night, although occasionally requiring a little sedative. She noticed some loss of spontaneity which she described as being subdued. Her husband said that she was more normal than she had ever been.

Case 2.—Mrs. E. A., a bookkeeper, 59 years of age, was seen in consultation with Dr. Karl Dortzbach, September 28, 1936, because of anxiety, agitation, disorientation, fear of being poisoned, and continuous pain in the rectum.

She was left a widow with two children in 1906 and supported both until they were ready to care for themselves. In 1920, one kidney was removed, but the other remained adequate. Periodic examinations of the heart, including x-ray and electrocardiogram, had shown only mild myocardial weakness. The blood pressure had never been over 170 mm. systolic. A sister and two cousins had been in mental institutions.

The patient's daughters for more than a year had feared a breakdown because of worry and fatigability, but the patient continued to work until May, 1936, when pain developed at the site of the old nephrectomy. In June, while on the commode, she had a "heart attack" with palpitation, dyspnea and cyanosis of the extremities. The first hint of disorientation appeared in August, and later the patient noticed a bitter taste in her mouth and complained that her food was being poisoned. She was depressed and confused, at times restless and at other times semi-stuporous. She slept poorly, wept copiously, and refused food. She took an intense dislike to her attendants because she thought they were abusing her and putting poison in her food. She did not know her nurses by name, often did not speak to her daughters, and occasionally was incontinent of urine. During the preceding six months she had lost 25 pounds.

Examination at the George Washington University Hospital, October 2, 1936, showed an elderly woman lying in bed with eyes closed, moaning and turning from side to side. She was uncooperative, confused, and disoriented. She was depressed, refused to keep her eyes open. During the examination she kept crying, "My piles! Give me something for my piles. Put some ice on them. Can't you stop the pain?" Rectal examination revealed nothing more than two pea-sized fibrosed tabs. She rubbed her tongue with a moistened handkerchief, whining, "It tastes just awful." Her skin was pale and her fingers and toes were cyanotic and cold. The systolic blood pressure fluctuated between 130 and 150 mm. of mercury. Blood studies showed a mild secondary anemia. The urine was normal. The gastro-intestinal tract and gallbladder were normal.

Prefrontal lobotomy was performed on October 6, 1936, using the technic outlined earlier in the paper, six "cores" being cut in each frontal lobe.

The temperature rose to 101° (rectal) on the evening of operation and returned to normal on the third postoperative day. The tendon reflexes were unchanged. At no time was a Babinski sign or a grasp reflex elicited.

On October 7, the first postoperative day, she lay quietly in bed without any complaints. She said she felt fine. She obeyed simple commands, but showed perseveration in speech. The following day she was brighter, had a placid appearance and responded to greetings, but could not give the name of her nurses or doctors. She had no recollection of having been operated upon or even of coming to the hospital. October 11, while having lunch, she vomited over her nurse. In relating the incident the next day, she said, "Yesterday I was having lunch in a restaurant on Pennsylvania Avenue with a friend and all of a sudden we vomited on each other." The evening of October 12, for an hour or so the patient became restless, angry, and struggled with her nurse. Her appetite and strength improved, however. She read the newspaper and on October 15 mentioned Roosevelt and Landon as the Presidential candidates. When asked what she expected to do on returning home, she answered, "I'm going to stay around at home a while and rest up and then I want to return to work."

"What sort of work is it?"

"It's down at the ——— Building and Loan Association. I was cashier there a number of years." She could describe the route from her home to the office.

Since operation her circulation has improved so that the fingers and toes, which had been cold and cyanotic, remain warm and pink.

October 25 she could read well, though her voice was monotonous. Her conversation lacked spontaneity, but was relevant, but her remote memory was good. She had no difficulty recognizing or conversing with old friends. She betrayed no anxiety, apprehension, nor nervous tension, and presented a calm, complacent ap-

Fig. 4a
The patient in Case 2 before operation.

pearance. She had not complained of a bitter taste or of being poisoned and had no discomfort in the rectum (*Figs. 4a* and *4b*). Mrs. A. returned to her job December 1.

Case 3.—Mr. L. R., 33 years of age, had been under observation at the Neurologic Clinic of the George Washington University Hospital for more than a year. His chief complaints were nervousness, worry, palpitation, throbbing in the head, fear of falling, and ideas of suicide.

The patient was brought up in a small community in North Carolina. He was cheerful and fond of sports. He was trained by his father as a concrete finisher. He had never been sufficiently interested in any girl to want to be married, but enjoyed the society of both sexes. With the onset of the depression work ceased, and he came to Washington to live. For two years he was on relief jobs, but worked only a few days each month. He had no friends and usually stayed by himself.

Between February and June, 1935, his mother noted that he was sluggish and preoccupied, that he was eating and sleeping poorly, and losing weight. June 12, 1935, while out looking for work, the patient felt as if he would faint; he had cramps in the abdomen and was forced to go to bed. He was apprehensive, tense, and could not sleep. He complained of throbbing in the occipit and in the epigastrium. Upon getting out of bed, he had palpitation and felt somewhat dizzy; his legs felt weak. He began to worry about his physical condition and noted that his hands and feet were cold.

Fig. 4b
The same patient ten days later.

He was afraid to walk out on the street because his knees might give away beneath him. For three months his meals were served in bed by his mother. In summer it was too hot to get out of bed and in winter it was too cold. The patient read books, but tired easily and his mother would often catch him staring at a book, but not reading. He indulged in fantasy and had occasional ideas of suicide. He was uncommunicative and rarely spoke unless he was spoken to. There was no indication of confusion, disorientation, hallucinations or delusions, but he was obviously preoccupied.

Physical examination was normal except that all teeth had been extracted. The cranial nerves, the upper and lower extremities were normal. The patient had a solemn, worried expression on his face and rarely smiled. He did not volunteer any information. While talking with his mother it was noted that she often asked him the date when something happened and he always responded quickly and correctly. There was no apparent intellectual impairment.

Prefrontal lobotomy was performed October 14, 1936, using the technic which has already been described. Nothing unusual occurred during the operation and the patient's condition was good throughout. At the conclusion of the operation the systolic blood pressure was 110 and the pulse 84.

Following operation the blood pressure remained normal. The temperature rose to 101° (rectal) and returned to normal on the third postoperative day. There was no disturbance of vesical function.

On the first postoperative day the patient was sitting up in bed talking to the other patients in the ward, so constantly that he was requested to be a little quieter. Formerly he had spoken to no one. Upon going into the ward, he greeted one of us as follows:

P.: "I am glad to see you, Doctor."

D.: "How are you feeling?"

P.: "I have a little pain in my head and the bandage feels rather tight."

D.: "How about the rest of you?"

P.: "I am getting along fine except that I haven't had anything to eat."

D.: "Any pains in your stomach?"

P.: "Oh, no. None at all. You know, it's a funny thing, Doctor. My hands and feet used to be so cold; even when I stayed in bed and put blankets on them they would still be cold. Now since the operation they have been warm. I think this operation is going to help me a lot. You know I have been talking a blue streak all day. I feel as if all that nervousness and worry were gone. You know, I am anxious to get back to work again."

The patient walked into the amphitheater on the third postoperative day. He felt well, his outlook was bright, he was alert and there was no apparent intellectual impairment; he counted backward from 100 by 7's rapidly and correctly. He was discharged from the hospital one week after operation and continued to do well upon his return home. When seen November 8 he said that he spent his time reading and working about the house and could walk eight blocks without discomfort. There is no further improvement as of December 15.

Case 4.—Mrs. E. C., a widow 59 years of age, re-

ferred by Dr. William T. Gill, Jr., had been under observation since March, 1935. Her chief complaint was fear of contamination.

She came to this country about thirty-five years ago with three children and her husband, who was a marble carver. They settled at Barre, Vermont, where he died of tuberculosis about ten years later, leaving her with four more children. She had worked hard all her life, educated her children, and she and her family were in a satisfactory financial condition.

At the age of 24 the patient first became worried about having tuberculosis, after having a tooth extracted under ether. Upon recovering she felt weak and unable to eat and feared she might get tuberculosis. Upon becoming pregnant at the age of 25, the fear of tuberculosis disappeared for over a year. During a later pregnancy her nervousness again disappeared and she had no difficulty for nine years. At the age of 34 or 35 she again became worried. She used to visit the sick, but became afraid that she might say or do the wrong thing and that she might carry infection from some sick person to her family or friends. She then stopped visiting the sick.

During the previous four or five years her fear of contaminating others had grown progressively worse. She would sit down to the table hungry, but be unable to eat. She decided to raise her own vegetables, but after seeing dogs and cats pass through the garden, she refused to eat anything from it because of the contamination. She would prepare food and then throw it in the garbage because she was afraid she might have contaminated it during the preparation. Other food she threw in the furnace because the grocery clerk had handled it. In passing a chair she would gather her skirts around her to avoid touching it. If a dog touched her dress, she would burn it and she had burned two coats because friends had taken her by the arm. Before sitting on the toilet she would scrub the seat for an hour. It required an hour to undress and another hour to shake out her bedclothes and pillows, and by that time she was exhausted. She would wash her hands over and over again to be satisfied they were clean and then a few minutes later would repeat the procedure. On her trip from Barre to Washington she remained for thirteen hours in her seat with hands folded, and refused to go to the diner or to the toilet. The patient realized that most of the things she feared never materialized, that if anyone acted as she did no work could be done, but she said: "I've got it in my head and it won't come out. It's silly, but I can't help it." Her condition had grown progressively worse and she became morose and greatly depressed.

Physical, neurological and laboratory examination revealed no abnormalities.

Prefrontal lobotomy was performed October 28, 1936, using the technic which has already been described. Six "cores" were cut in each frontal lobe. The operation was uneventful and the patient's condition was good the entire time.

When the patient was examined upon her return from the operating room a suggestive Babinski sign was present on the right, but not on the left. The other reflexes were normal and there was no impairment of motor function. On the first postoperative day the patient's speech and manner were as they were before operation except that she had lost her worried look. When asked if she noticed any difference since operation she replied: "Yes. I have no worries." On the second postoperative day the following conversation took place:

D.: "Good morning. How are you?"

P.: "Fine, Doctor."

D.: "How did you sleep?"

P.: "The nurse says that I slept real well."

D.: "Have you been worried about anything? Has anyone contaminated you by touching your clothing or bedclothing or have they contaminated your food?"

P.: "No. I have no worries." Patient turned to her nurse and said: "You know, I can't worry any more."

The patient was out of bed on the fourth postoperative day and was discharged from the hospital on the seventh postoperative day. She was alert, cheerful, ate well, washed her hands only at meal time and used the toilet without washing the seat. She remembered accurately and discussed the details of her obsessions.

Soon after leaving the hospital the patient inspected a model house and on the tenth postoperative day went to a moving picture, read the newspaper, read her mail, and wrote twelve postcards (*Figs. 5a* and *5b*). Six weeks later there was some return of her distress occasioned by a dog in the house, and some of the compulsive acts have returned.

Case 5.—Mrs. V. G., 47 years of age, was seen in consultation with Dr. Sidney Cousins because of a depression of nine months' duration. It was characterized by anxiety, apprehension, insomnia, ideas of suicide and one unsuccessful suicidal attempt.

The patient was married in November, 1911. Her husband said that even before she was married she became easily depressed. The day after her child was born in 1918 a depression started that lasted five years. The patient was unable to carry on her household duties so that it was necessary to close the house and

Fig. 5a
The patient in Case 4 before operation.

Fig. 5b
The same patient six days later.

live with relatives. There was some fluctuation in the depth of the depression during this period and she had no ideas of suicide. Recovery was attributed to the repair of lacerations.

Since 1923 the patient had had spells of depression about every eighteen months, lasting from a few weeks to two months. Even during her more normal periods she made preparation for any event long in advance. If she did not finish her Christmas shopping by Thanksgiving, she was uncomfortable. Before a party she always prepared everything at least one day in advance. She fussed about inconsequential things. Everything relating to the house had to be perfect and before any period of absence she worried terribly about how her husband and son would get along without her. She even was afraid that they would not be properly fed and clothed.

February 5, 1936, the patient caught "grippe" from her son, whom she had been nursing; she got up too soon, had a relapse, and then developed a depression that persisted until operation. At first there was an exaggeration of her usual traits of character, that is, worry, anxiety, and apprehension. Then the depression overshadowed these symptoms. She used to say to her husband: "I know that I am going to get worse and I will have to go to St. Elizabeth's Hospital. Please try to find a sanatorium for me so that when I have to go to a sanatorium it won't be to St. Elizabeth's. I don't want to be put in a strait jacket."

She told her husband repeatedly: "I am just a loadstone around your neck. I don't want to burden you. I wish you would divorce me. I will never get well and I don't want to burden you." She discussed various methods of suicide.

She was taken to a sanatorium, where she remained from June 11 to October 30, but was unimproved. October 14 she escaped from the sanatorium, went into a strange house, closed and plugged the doors and windows, and turned on the gas. She was unconscious ten or twelve hours and upon recovering was drowsy for several days. After taking gas her memory was impaired, but the depression remained as before, though agitation was reduced. Recently there developed a gross tremor of the hands (*Fig. 6*).

Upon examination the patient appeared greatly depressed. She talked in a low, monotonous and somewhat whining voice, but with good enunciation. She showed little interest in her surroundings. She knew her name and address, but was disoriented as to time and place. She said that she was so distressed and sad that she did not wish to live. Except for gross tremor of both upper extremities and unsteadiness of gait the physical and neurological examinations revealed nothing abnormal.

Prefrontal lobotomy was performed November 3, 1936, at the George Washington University Hospital. The usual technic was followed, cutting six "cores" in each frontal lobe.

That same evening the patient said that she felt pretty well and was no longer depressed. The coarse involuntary movements of the hands and forearms had disappeared. The tendon reflexes and plantar responses were normal. On the first postoperative day she looked complacent and said she was worried about nothing. When her husband entered the room she spoke to him calmly, calling him by name, and when he left the room she told him goodbye in a quiet way without any emotional disturbance. Before operation she had clung to him and begged him not to leave her. During the first week after operation she recovered her strength rapidly and walked about the corridors of the hospital as early as the fourth day. In the morning and the early part of the afternoon she was quiet and calm and spent a large part of her time knitting. She looked at pictures in magazines and read a little. She became restless in

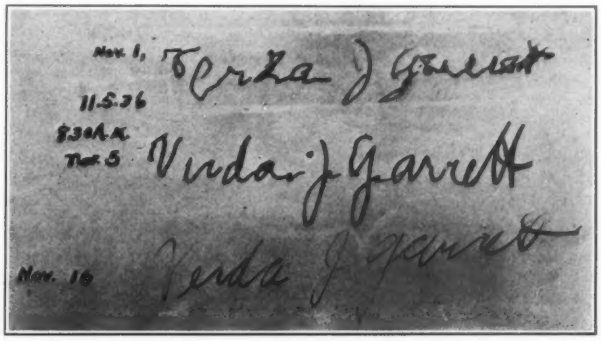


Fig. 6
The signature in Case 5 before operation, two days later and two weeks later.

the evening and at times agitated. Before becoming restless she realized the change coming over her and remarked several times: "I feel like I am going to explode." She would then rub her hands together rapidly, develop a worried expression and often repeat sentences over and over again, such as "What am I going to do? What am I going to do?" In superficial conversation she appeared interested and her enunciation was normal.

She is still disoriented, very forgetful, and shows confabulation. In playing solitaire November 14 she showed marked speed, but poor judgment, "cheated," but when spoken to even sharply, or when one hand was held she continued placidly and with obvious enjoyment: "I dont' mind your talking to me that way. It doesn't matter a bit." Six weeks after operation she still showed hyperactivity, but her mood was complacent. She is now in a mental institution.

Case 6.—Mrs. M. S., 32 years of age, referred by Dr. Richard B. Silvester, first came under observation in October, 1934, with a benign depression that lasted one month. There was a recurrence of depression in September, 1936, initiated by insomnia, apprehension and anxiety, and at this time associated with hallucinations and ideas of guilt, and she was again seen on November 2.

The patient worked under pleasant conditions as a secretary, managing the correspondence, the petty cash, the bookkeeping, and the small telephone switchboard.

She was married in August, 1933, and soon after that had frequent crying spells. She became nervous and riding in traffic with her husband was often intolerable. She slept poorly, often experiencing insomnia for two or three nights at a time, but managed to do her work. With the onset of her menses in October, 1936, she felt depressed, exceedingly nervous, and the radio annoyed her and caused her to become nauseated. On October 15 she developed a humming noise in her head, which became louder and louder, and a sense of pressure in the region of the xiphoid process. Noises and loud voices upset and excited her. She worried lest her illness made her lose her job.

About October 29 she appeared startled, would say, "Wait a minute. I'm getting a message." Then, holding her watch to her ear, she would appear uneasy, cover her face with her hands, and begin sobbing. The voices told her she was a devil, a demon, a dog. She said: "I sent her to heaven and her soul went to hell. If I could only straighten things out."

While being examined she looked at one of us and said: "I see the devil in your eyes." She herself seemed terrified. During the conversation she said: "You are just punishing me for my sins. When I was young I was a thief. I used to steal pennies out of my sister's box. Once I hid some chocolates. I was caught shoplifting once. It wasn't much, but nevertheless it seems an awful thing to do and I've got to be punished for it. Do you suppose I am going to be punished for that? Please forgive my sins." During such conversations she exhibited great anxiety and apprehension. When removed to the hospital she was very restless and alternately tense and excited. Physical examination was negative.

Prefrontal lobotomy was performed November 5, 1936, using the usual technic. Following operation the patient's condition was good; she presented no reflex changes and no disturbance of vesical function. She was correctly oriented, relieved of her anxiety and apprehension, and no longer tense. The hallucinations continued, but no longer aroused in her the intense emotion response. She ate well and required less sedative for sleep. Upon discharge on the seventh day the wounds were well healed and she was walking naturally. The hallucinations were occurring at rarer intervals ("My ears have gone dead") and the lucid intervals were longer, but when she was fatigued she talked irrelevantly about her husband, her brother and men in general. She did so in an off-hand, rather amused manner, without the intensity that formerly characterized her assertions. Memory for recent and remote events seemed adequate. Two weeks after operation the palms began desquamating, and the hands were warm and pink. A month later periods of anxiety occurred less frequently and she was planning to return to work in two weeks.

COMMENT

In making this preliminary report upon a small series of cases we wish again to define our position in regard to the operation. We have undertaken it as a measure of relief from symptoms that were causing great distress to the patients and to their families. These symptoms have been worry, apprehension, anxiety, sleeplessness and nervous tension. These symptoms have tended to subside following operation, and the patients have become more placid, more content, and more easily cared for by their relatives. The symptomatic relief has been almost immediate, and has persisted to the present time. We have not yet been in a position to establish controls satisfactory to ourselves or to others, such as simple anesthetization, incision of the scalp, drilling holes in the skull, unilateral operations, or partial operations, in an effort to determine what part is played by the procedures other than the actual reduction in the number of axis cylinders interrupted. That such experimental procedures should be carried out is highly desirable, but our duty to the patients has precluded these, and we have followed to the letter the suggestions of Moniz.

We wish to emphasize also that indiscriminate use of the procedure could result in vast harm. Prefrontal lobotomy should at present be reserved for a small group of specially selected cases in which conservative methods of treatment have not yielded satisfactory results. It is extremely doubtful whether chronic deteriorated patients would be benefited. Moreover, every patient probably loses something by this operation, some spontaneity, some sparkle, some flavor of the personality, if it may be so described. In the patients operated upon up to the present, memory has not been obviously

impaired and concentration has been improved, possibly on account of relief of the preoccupation. Judgment and insight are apparently not diminished, and the ability to enjoy external events is certainly increased. Special psychological tests will be used to determine whether learning ability has been affected, and only a return to the previous occupation will reveal whether these patients are able to function satisfactorily at the socio-economic level.

SUMMARY

Six patients have been subjected to subcortical lobotomy of the prefrontal white matter for the relief of anxiety, apprehension, nervous tension and insomnia, the common denominator in a diversified group of mental disorders. The immediate results have been satisfactory, and certain other symptoms such as depression, preoccupation, disorientation and delusions have been favorably influenced. The outstanding deficit symptom is a certain lack of spontaneity. A large series of cases observed over a long period of time with careful measurements of intellectual functions will be necessary before prefrontal lobotomy can be evaluated as a therapeutic measure in the treatment of mental disorders.

REFERENCES

1. Moniz, Egas: Tentatives operatoires dans le traitement de certaines psychoses. Masson: Paris, 1936.
2. Harlow, J. M.: Recovery After Severe Injury to the Head. Publ. of the Mass. Med. Soc., **2**:329, 1868.
3a. Fulton, J. F.; and Jacobsen, C. F.: The Functions of the Frontal Lobes, a Comparative Study in Monkeys, Chimpanzees and Man, in 15th International Congress, Advances in Modern Biology IV, 113, 1935. Moscow: State Biological and Medical Press.
3b. Jacobsen, C. F.; Studies of Cerebral Function in Primates. Comparative Psychology Monographs No. 63, 1936.
4. Brickner, R. M.: The Intellectual Functions of the Frontal Lobes: A Study Based upon Observation of a Man after Partial Bilateral Lobotomy. New York: Macmillan, 1936.
5. Ackerly, S.: Instinctive, Emotional and Mental Changes Following Prefrontal Lobe Extirpation. Amer. Jour. Psychiat., **92**:717, 1935.

DISCUSSION (*Abstract*)

Dr. Adolf Meyer, Baltimore, Md.—I am not antagonistic to this work but find it very interesting. I have some of those hesitations about it that are mentioned by other discussants, but I am inclined to think that there are more possibilities in this operation than appear on the surface. I do not think that the relief afforded the patients is so much a shock result as utilization of some things we are learning concerning the frontal lobes and their role in the functioning of the personality. I should hesitate to promise that we could remove distraction and worries by operation. To call attention to what is possible might start an epidemic of hasty human experimentation. After all, any interference with the brain, such as is contemplated in this operation, makes reductions which cannot be repaired. The work should be in the hands of those who are willing and ready to heed the necessary indications for such a responsible step and to follow up scrupulously the experience with each case. The available facts are sufficient to justify the procedure in the hands of responsible persons, but it is important that the public should not be drawn into any unwarranted expectations. At the hands of Dr. Freeman and Dr. Watts I know these conditions will be lived up to.

Dr. Walter J. Otis, New Orleans, La.—The presentation of this paper has added many new features for further study and research in the treatment of mental disorders. I should like to ask the essayists if questions involving forensic neuropsychiatry have been considered, that is, whether permission had been granted in these cases or was it necessary, and the attitude of the patients or representatives in granting this permission, for we must keep in mind in treatments of this sort the possibility of medico-legal involvement.

After hearing the discussion of the cases as furnished, I feel that these were not frank psychoses as such, possibly borderline, but more within the realm of functional episodes or disorders.

However, the essayists are to be congratulated in their attempt to give comfort, courage and hope to patients suffering as these were.

Dr. Freeman (closing).—We appreciate the criticism that we are destroying something that cannot be replaced. The very much greater degree of damage to the frontal lobes in Dr. Ackerly's previously reported case, with excellent preservation of intelligence, encourages us to go ahead, although we recognize the need for thorough psychological testing of the patients after operation.

This is certainly not an operation that should be given out for wholesale application.

We secure ourselves whenever possible by obtaining the consent of the patient as well as of the nearest relative.

The operation is not a shocking procedure. We recognize the fact that certain individuals during a psychosis manifest improvement or even recovery following shocks of various types, but the recoveries following surgical operation (recoveries from the mental symptoms, that is) are small in number. Moreover, this operation is not a shocking procedure, as is shown in the protocols and by the fact that there is little change in pulse rate, blood pressure, respiration, or temperature.

We have attempted this operation for the relief of symptoms that were rebellious to more conservative means of handling. We have not mentioned recovery. We have not spoken of cure. These words cannot be used until after a period of five years. The greatest relief has been noted in that symptom that might be called anterograde algimnesia, the painful remembrance of things that never will happen. The most striking result to date has been the almost immediate cessation of agitation and apprehension.

THE TREATMENT OF ANGIOMATA WITH RADIUM*

By WILLIAM S. NEWCOMET, M.D.
Philadelphia, Pennsylvania

There is no single group of cases so neglected by the medical practitioner as are birth marks. Many of these unsightly disfigurements may easily be removed and the individual spared this life-long disfigurement if the mark is properly treated in the beginning. The average physician, as a rule, seems assured of the futility of treatment in these cases and prefers to accept the inevitable and to permit the defect to take its course.

The correlation of several hundred histories shows that many of these marks, particularly the hemangiomas, appear shortly after birth, often beginning with an area not larger than a pinhead and gradually extending, for a month or so, until they attain their permanent size, showing very little difference as the child develops. Some, at certain periods, will take on a new growth, but these are the exception. Just what process occurs in these vessels is unknown and very little emphasis has been placed upon this fact, which is very important in the light of treatment since it is in this stage that radium will check its progress.

The mole, on the other hand, shows only a slight change in structure from its first appearance and grows proportionately with the growth of the individual. It is much more likely to take on new growth in later years than are the hemangiomas.

There are some who believe that the treatment of these defects will lead to malignancy and, while this has been observed where the treatment has produced a marked change in the tissue, it must be remembered that many of these defects undergo malignant degeneration spontaneously and at any age. While malignancy seems to occur more frequently in the pigmented mole, it is probably due to the fact that moles are more common than marks of other types.

While no routine form of treatment can be given which will apply to all cases, the essential purpose must be to produce the best cosmetic result, since most of these defects appear upon the exposed surface of the body.

In a list of 506 cases, 303 were upon the face. It may be said that many marks upon other parts of the body pass unnoticed and are not recorded; this may be true to some extent, but the number upon the face so far exceeds any of the other localities that it seems improbable. In this list, 27 of the marks were upon the head, 26 upon the arms, 20 on the legs and 20 upon the neck. It seems reasonable, therefore, to conclude that the tissues of the face and head show a decided susceptibility.

It would also appear that sex had some influence upon the development of these defects. In this same list 349 were females, while only 157 were males. Again the argument might be advanced that vanity moved the females to seek treatment. But pride does not explain the appearance of eight cases where marks were found upon the female genitalia, while only one male reported. Nor does it account for several other females' being seen since this list was published, but no male.

The Negro appears to be free from these defects, as only one case was observed in this list, with hemangioma upon the face. Since then two other cases have come to light: one with the mark upon the forehead, the other upon the end of the finger.

STUDY OF CASES

Before treatment is begun photographs should be made and careful notes taken of the local condition. A thorough inspection of the general physical state of the patient should be made and where the masses involve the face the tissue of the orbit and the eyeground must be examined, since it will frequently be found that the vascular changes penetrate into that organ. The extension of these masses is not always upon the surface. The depth to which the vessels force a passage was illustrated by the treatment of a hemangioma of the neck, which was each time followed by a severe bronchopneumonia. X-ray examination showed that the mass extended well into the left chest. A good photograph will be found to be of inestimable value for reference. It is surprising to find that many of the parents will, years later, forget the original appearance and claim that the picture grossly exaggerated the condition.

Complications. — During the treatment of these marks there may be alarming complications; the commonest is ulceration, in which

*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

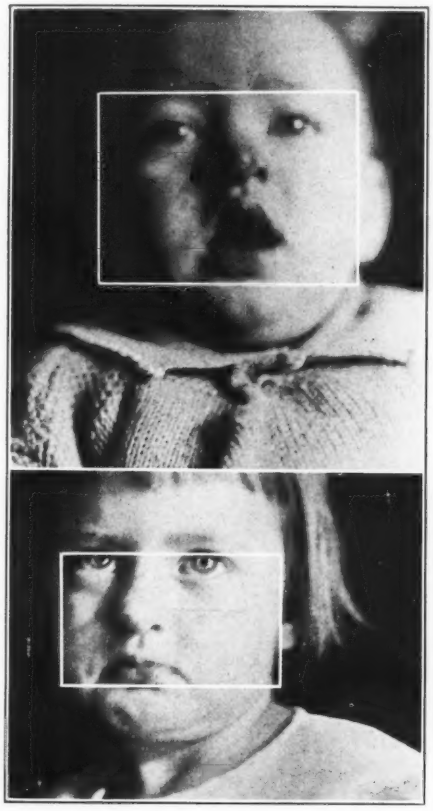


Fig. 1
(Top)—D. S., February 23, 1933. Showing a hemangioma of the nose and lip.
(Bottom)—D. S., July 6, 1934. Result of treatment after the application of radium.

the whole area becomes gangrenous. It will often occur spontaneously, without the provocation of treatment, and when it does appear it usually causes a rather ugly scar. Curiously enough, under these circumstances hemorrhage is rare. The disfigurement following such ulceration may be explained by the fact that the remaining normal tissue elements between the vessels are entirely destroyed and are replaced only by fibrous tissue. Ulcerations of a similar character are often seen after the application of caustic or carbon dioxide snow.

Spontaneous collapse of the mass is infrequent and usually occurs in those masses having a heavy, healthy, overlying skin. It is evidently caused by a closure of the afferent blood vessels. The sudden contraction of the mass leaves the surface shrunken and shriveled and it requires considerable time to regain its normal tone. In the cavernous type of hemangioma the relation of the vascular structure to the sound tissue will have a rather marked influence upon the result obtained after irradiation. In those cases where the vessels produce a soft boggy mass with very little supporting normal tissue, when the mass contracts there is apt to be a rather large amount of deformity, and if it occurs about the face the results are not pleasing. The same type of tumor appearing in the scalp will collapse, the sound tissue contract and in a short time, possibly a year or so, hair will finally conceal the area. One must have a thorough understanding of the condition

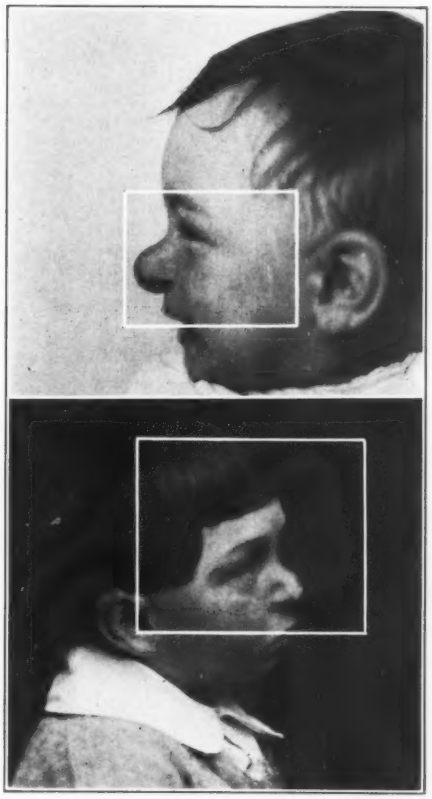


Fig. 2
(Top)—F. B. Hemangioma of nose, no superficial vessels, but the mass soft and boggy.
(Bottom)—F. B. Result after treatment with radium, cross-fire method.

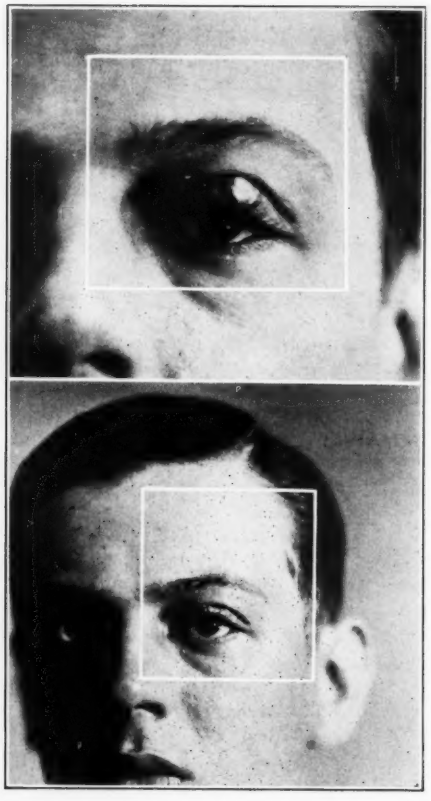


Fig. 3
(Top)—E. K., June 19, 1928. Hemangioma of eyelid, with moderate degree of ptosis.
(Bottom)—E. K., June 19, 1930. After treatment with radium. Note the eyelashes and eyebrow have not been injured.

and the results to be expected before treatment is begun.

The slight erythema produced by irradiation will, at times, cause an itching sensation and infection may follow a persistent scratching. Resultant ulcers will produce scarring and may be classed with the ulcers following the application of caustic. Atrophy of the part may result from irradiation, especially if the tumor mass is over the ends of the bones, and may give rise to serious problems. Some of the defects arising from the treatment of these tumors can be corrected by a plastic operation; but extreme care should be exercised in order to avoid these complications.

In patients who develop infectious diseases, as measles or scarlet fever, the exaggeration of the local process, in addition to the general systemic disturbance, may become quite alarming. A toxic condition may appear in some children and cause a febrile reaction or a rather extensive skin irritation.

Results of Treatment.—A large proportion of cavernous hemangiomas will disappear after a very small amount of irradiation, especially if it is applied as soon as the condition is discovered. It often leaves the skin perfect with its covering of down and without the slightest scar. Even areas 4 to 5 cm. in diameter have been treated upon the scalp and in many instances hair has grown, leaving no trace of baldness. If, for some unknown reason, the application of a mod-

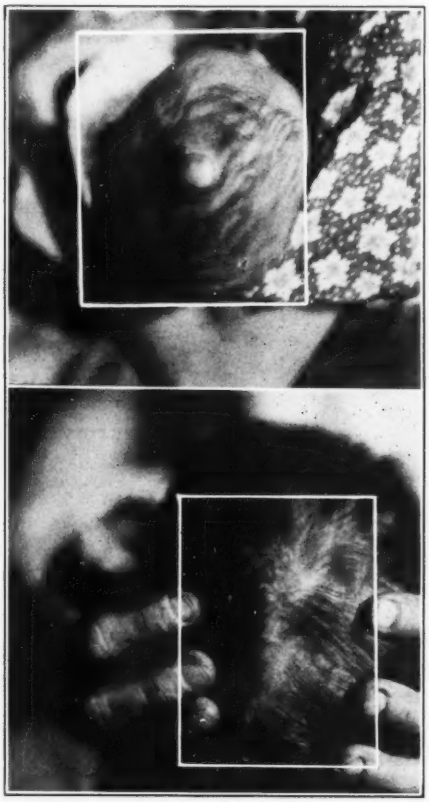


Fig. 4
(Top)—M. B., May 28, 1935. Hemangioma of the scalp. The size and shape of this tumor is frequently seen.
(Bottom)—M. B., November 2, 1936. After treatment with radium, no scar, no baldness, no recurrence. Of the twenty cases treated, the only one showing scar or baldness was one that recurred after operation.

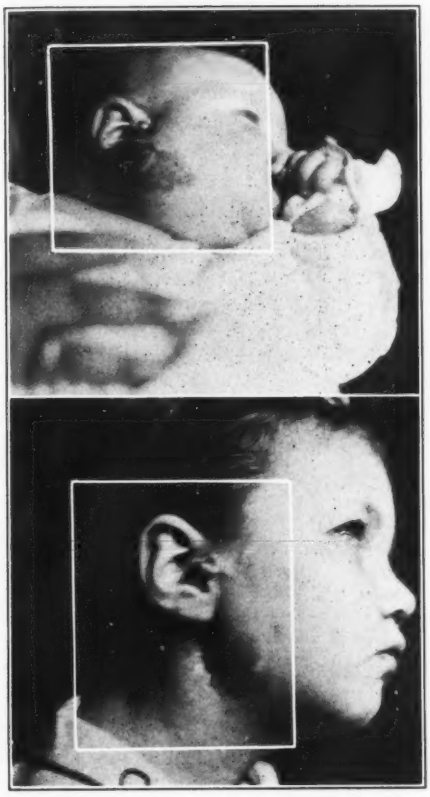


Fig. 5
(Top)—A. M., May 24, 1932. Large hemangioma of the face and neck, with dilatated vessels.
(Bottom)—A. M. Result after application of radium. The area of discoloration is due to the very relaxed skin.

erate amount of irradiation fails, the method of treatment should be changed, but the result will be less perfect. This condition of refractoriness to irradiation is more often discovered in cases where there is considerable fibrous tissue, or the mixed type: lymphadenoma and the moles. Perverse as it may seem, at times rather large moles can be removed by irradiation with the same ease required for other defects and with equally good results.

The angiomas must not be regarded lightly even in those cases where there is only a slight superficial blush, as the amount of deep involvement is often surprising. They frequently penetrate to the bone. This is one of the reasons why good results are difficult to obtain in this class of cases, the so-called port wine stains.

The aim in all treatment should be to produce the change in the defect with as little injury to the surrounding tissue elements as possible. Where the normal tissues have been greatly altered, either from a developmental defect or pressure change from the growth, normal conditions after treatment cannot be expected. In a case, however, where the pressure of the growth had displaced the primary teeth, after removal of the mass by irradiation the permanent teeth came in, several years later, were in perfect alignment and the jaw bone was normal in size.

Recurrence After Operation.—It would be interesting to have statistics of the recurrence of hemangioma after operation. It may be conceded that a few cases will do well after surgical removal, but a considerable number have come under irradiation treatment for recurrence after operation, and some of these cases have already shown a marked extension. In one instance two separate operations were performed by a well-known surgeon with recurrence following each one. Therefore, it is strongly recommended, if operation is contemplated, that the mass be previously irradiated to prevent extension or recurrence. Occasionally the surgeon may be disappointed by the complete eradication of the mark by irradiation alone.

The mole, when removed surgically, does not

Fig. 6
M. C. Hemangioma of the tongue, treated by radium to control hemorrhage.

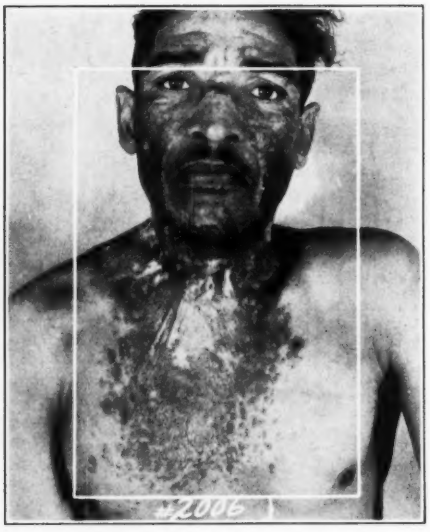


Fig. 7

J. B. Hemangioma of face and neck showing skin changes from CO_2 ice, electrocautery, x-ray and radium with ulceration on right side of neck.

show this tendency to recurrence, but the lymphadenomas frequently do.

Etiology and Pathology.—Knowledge as to the cause and development of these defects is limited. While there seems to be some support for a belief in heredity, it is far from conclusive, although more convincing than the theory of prenatal influence. These defects are strongly defined in their pathologic appearance, yet mixed types are found, and in the study of many cases they blend so evenly that sometimes it is impossible to separate them. From the standpoint of treatment, the vascular variety with large vessels and well marked borders will respond best to irradiation, while those containing a greater amount of fibrous tissue are more resistant.

The melanoma and the so-called "blue mole" are, at times, mistaken for a small hemangioma, but their history, gross and microscopic appearance are quite different. The prognosis must always be guarded even when they are treated by the most approved methods. In many instances their removal has apparently caused them to take on a very rapid growth, with wide dissemination throughout the body, resulting in death. If they are treated by wide excision before this growth begins, recurrence is unusual. However, the common history is as follows: for years a small bluish colored mole was observed; it was inoffensive and little attention was given it until, for some unknown reason, it began to enlarge. After a practitioner was consulted and possibly some caustic applied, it healed, but promptly recurred and soon had spread beyond recovery.

Pathologically considered, there are three distinct types: (1) the hemangiomata, which are divided into different types according to the character of the vessels they contain, arterial, venous and capillary, with still another division depending upon the size of the vessel, such as cavernous or capillary. (2) The lymphangiomata are composed of lymphoid material. (3) The pigmented nevi are composed of an overgrowth of the various cellular elements and differ widely in their structure.

Sequelae.—The after effects of irradiation of the various types of nevi are not unlike those encountered following the treatment of other diseases. Naturally, it is often difficult to balance the dosage so as to give a complete recession of the mark without some injury to the supporting structure. This injury is not always obvious at first; not until several years have elapsed can a proper estimate be placed upon the final result, where, for some reason, it has been necessary to push the dosage until a well marked erythema has been produced. There may be complete removal of the growth, with a perfect skin, but not until some time later, two years or more, will the fine dilated vessels be observed to be of quite another character from those which have been destroyed, and there may also at that time be marked areas of telangiectasis. It is more apt to occur in those patients having a ruddy skin. In the brunette, where the irradiation has been pushed beyond skin tolerance, it is likely to be followed by areas of increased pigment. The color of these sections is rarely homogeneous but rather blotchy, the general surface being brown interspersed with darker areas of an irregular shape. In some instances the results have been far worse than the original lesion; and, while they have been observed after the removal of hemangiomata, they are more likely to occur after the removal of moles. This pigmentation usually appears as the inflammatory process subsides.

In some cases where there has been excessive reaction, with destructive change in the tissues, it will be found, after healing has taken place,

that there is a glazed surface which continues to desquamate for years after the treatment has been discontinued. Where such a condition exists it should be regarded as one of potential danger for the future development of malignancy. Therefore, it is best to remove it, and replace it with a flap of sound skin.

Keloids are at times troublesome and are usually observed only in those cases where there has been extensive ulceration. In a large tumor mass composed of large vessels, as some hemangiomas, the normal tissue will be so displaced as to cause a noticeable deformity, and although this grows less as the child advances in age, at times it may be necessary to resort to a plastic operation. These defects are in direct contrast to those caused by the effect of irradiation over the long bones where the deformity will increase with the age of the patient. This contraction of the tissues is sometimes noted in the soft structure, most commonly about the lip or tongue. Therefore, when treating nevi of these parts it is better not to push the treatment until the organ appears to be of normal size; but, after the greater part of the mass has subsided, leave the remaining portion for treatment when the child is more mature. In this way a better balance is restored. This contraction is particularly annoying in the tongue cases. Irradiation was successfully employed for the control of hemorrhage of the tongue as it developed in two young girls. The tumor was only partly reduced at the time, but as years passed no further treatment was required as the mass had greatly diminished and the tongue was of normal size.

Most of these sequelae can be avoided by applying treatment slowly. Never be in a hurry to repeat an application. Only in those cases where the process is rapidly extending is there any necessity for haste.

COMMENT

Every one familiar with this field must realize the very wide difference that exists between the degrees of tissue involvement in the various forms of hemangioma: the depth, the size of the vessels, the amount of supporting fibrous tissue and the penetration into the various organs of the body. These factors must be dealt with separately. Therefore, no direct line of treatment can be given since each case requires specific attention. When the other forms of birth marks, such as moles, are included the subject becomes still more complex. As was previously stated, these tumor masses are benign and while there seems some slight danger of malignancy it is rather remote. The removal of these objectionable and unpleasant defects is more for the comfort and convenience of the patient since they may interfere with function but are not dangerous to life. Under these conditions their treatment must be conservative. The patient's welfare must be considered. The easiest method is not always the best. Many times has it come to the notice of the radiologist that a surgical operation or caustic was applied to remove a small mark and a scar remained. As every child is entitled to a body as nearly perfect as science and skill can make it, unnecessary blemishes to carry through life are unpardonable and should be guarded against by the practitioner.

If these marks can be treated and leave no scar then adopt the method which will produce this result. Radium, when properly employed, seems, in many instances, to meet all requirements. While some claim that an application of caustic or a surgical operation may erase the mark in a few weeks, the scar will last throughout life to register the signature of the operator.

THE OPHTHALMOSCOPICAL DIFFERENTIATION BETWEEN PAPILLEDEMA AND PAPILLITIS*

By ARTHUR J. BEDELL, M.D., F.A.C.S.
Albany, New York

The diagnosis between papillitis and papilledema is sometimes so difficult that it has engaged the attention of medical men for many years. As word descriptions are untrustworthy, and as the details of the appearance of the fundus can be accurately transmitted from one observer to another only by means of pictures, stereoscopic photographs will in all probability be the medium through which earlier and more exact differentiations will be made.

The subject will be considered under three subdivisions:

(1) A discussion of the normals which suggest by appearance some pathological optic nerve change.

(2) Definite nerve-head swelling, papilledema.

---

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

(3) Optic neuritis, papillitis.

A complete mastery of the normal fundus variations is essential before one is competent to express an opinion in these cases.

Some variations from the accepted normal include changes in the appearance of the disc and contiguous retina. The retina may be edematous without any swelling of the nerve-head. This is demonstrable with the photographs which show a flat, sharply delimited disc with appreciable edema of the clear, transparent overlying retina which may be well separated from it and yet retain full function.

In other cases the retina is more translucent, so that where the nerve fibers are most abundant, the nasal side, the disc outline is hidden but the temporal half is not obscured. A thick temporal layer may in some partially conceal the disc edge in that region.

A covering of connective tissue or glial remnants may confuse, but the retinal vessels always supply evidence which assists in differentiating it from either past or present edema. The congenital epipapillary membrane is too distinctive in structure and position to need a lengthy description, for it is always attached to the nasal side of the disc.

Colloid collections on the surface of the disc may simulate papilledema, but a careful focusing and parallactic investigation with red and red-free light will always bring the rounded bodies in relief and establish the diagnosis.

When the eye is hyperopic, or astigmatic, some distortions may temporarily mislead, although the greatest difficulty in diagnosis is experienced in the type where the nerve is elevated to such a degree that the vessels are partially concealed and look like guy ropes holding a canvas balloon to the ground. These cases are devoid of any other suggestion of pressure within the orbit or cranium. They do not change and accurate observations extending over years fail to disclose any alteration in them.

Another type is less distinctive, and it may be necessary to use all the refinements of clinical examination correctly to label this nerve-head change as physiological, for it looks like an early papilledema, but there are no neurological symptoms or field changes. This is alluded to as pseudo choked disc. In hyperopia the vessels are tortuous and frequently dip sufficiently into the retina to be lost to view in part of their course. In myopia they follow the normal contour.

Great massive retentions of the nerve sheath rarely puzzle the ophthalmologist, for the fibrillation of the structure is characteristic. It is sometimes difficult to recognize a flat sheath encircling the disc when it simulates a mild papilledema.

It must be apparent that pathological changes can be added to those of a congenital nature.

Before continuing the discussion of the appearance of the nerve-head, it is advisable to mention the two symptoms which must be understood to separate the various elements in this subject, vision and field changes, for many obscure cases are simplified by the evaluation of them.

Usually vision is not disturbed in pseudo papilledema, or in true papilledema, as early or as severely as in papillitis. This is always a guide to their symptomatic differentiation.

The great variety of field changes, resulting from inflammation or pressure upon the nerve, call for special discussion and are only mentioned in this connection so that emphasis can be placed upon them by anyone who attempts to render a diagnosis in optic nerve lesions.

Papilledema is a swelling limited to the nerve-head and extending beyond it only as the process advances. This would necessarily exclude so-called neuroretinitis and the term papilledema should only be used when the nerve-head is solely attacked and where the only vessel changes are those incident to the constriction of the nerve and the result of the retinal invasion from the disc.

Even with this limitation the disc in papilledema presents many different pictures, some resembling those which we have just described as normal variations. Strict attention must be paid to the type of swelling, the changes in the vessels, and also the displacement of the retina.

In a case of frontal lobe tumor the patient first came under observation when one disc was white from atrophy and the other choked with cloudy, rounded outline, full veins and a delicate almost diaphanous smoky haze over them.

In calcification of the choroid plexus, the disc was pallid with greater vessel changes, increased artery reflex and a cloudy overlayer. The swelling remained strictly limited to the usual outlines of a normal disc and much of its margin was distinctly visible. The opposite disc was pale and covered by a clear, transparent retina. When in such cases the cause is removed, or the condition lessened an atrophic zone of unequal width and size surrounds the flat disc.

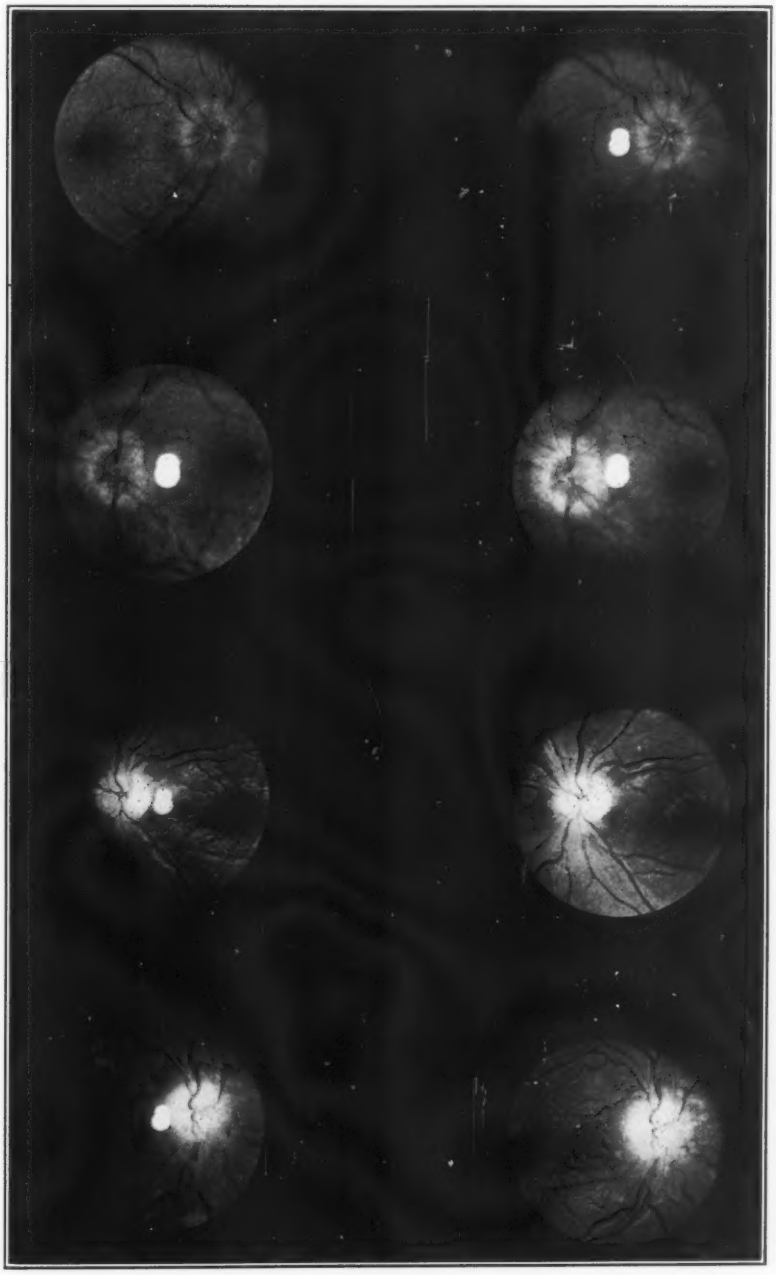


Plate I

Papilledema, "choked disc." Stereoscopic photographs (Bedell).

Fig. 1. Temporal lobe tumor. Right eye.
Fig. 2. Left eye same patient.
Fig. 3. Calcification of the choroid plexus. Left eye.
Fig. 4. Right eye same patient.

In another group of brain tumors the disc extends beyond its scleral confines, is covered by a thick opaque retina and a pale ring is evident in the parts of greatest swelling. Both eyes are similar, although the degree of disc elevation differs and the pallid rings are not the same size.

After the relief of pressure the retina becomes transparent with a wavy, undulating surface and the retinal veins are larger than during the period of greatest swelling.

In a large meningioma of the choroid plexus of the right lateral ventricle, the nerve-head was definitely elevated and swollen, and the central excavation veiled by the edematous retina. The arteries were tortuous and the veins engorged. There were no hemorrhages or exudates.

In a bilateral olfactory groove meningioma the disc on one side was so swollen and so opaque that all outline was lost and yet the retina was transparent, the veins were enlarged and the arteries were small. On the opposite side the cloudiness of the retina almost completely obscured the disc and the small arteries showed definite white perivascular streaking.

After operation the flat white disc was clearly outlined with a partial ring of circumpapillary depigmentation, decreased overlying retinal swelling and less fullness of the retinal veins.

The preceding types were unaccompanied by retinal hemorrhage. Extravasations may be single blood streaks in a hazy retina, widespread small superficial hemorrhages proximate to the swollen disc or larger hemorrhages on the side of the disc. Frequently, even in the classical choked disc, hemorrhages are not only on the side of the swollen nerve-head, but in the retina at some distance from the limits of the elevation. Seemingly they bear little relation to the diameter of the disc or the degree of swelling. Detailed reports are essential to establish these differences and only photographs will suffice to record them. Sometimes a crown of blood may outline an extensive broad disc swelling on one side, while the other disc may be much smaller, project farther and present more abrupt sides. This is well illustrated in the papilledema found in a case of metastatic lymphosarcoma of the left frontal lobe.

The next variable in papilledema is the appearance of the disc surface. This may be glistening, transparent, cloudy, dull or translucent, fibrous, like teased cotton, or thick dense gray like a woolen blanket. In all cases the surface swelling fails to efface the central excavation or destroy the limiting edges of the papillimacular bundle. The excavation may be shallow and narrow and the macular bundle faint, but both can be distinguished photographically.

Intracranial pressure may be extreme and continue so long that a papilledema of high degree develops, and the discs become pallid from constriction. This was well shown in a woman of 34 who had had several pairs of glasses in a few months because of an intractable headache. Bilateral papilledema was present, although central vision was retained, and enlarged blind spots were the only field defects. A left parietal meningioma was found at operation.

The fundus picture of a glioma of the optic nerve and chiasm shows the postpapilledemic atrophy of the disc and oblique wrinkles in the retina.

In acute arachnoiditis and in the chronic form, papilledema is often characterized by great swelling, extreme vascularization, and streaks of perivascular exudate. In other cases the disc is elevated with no exudate lines.

A recent case of right frontal glioma was examined after the patient had repeated refractions, sinus operations, teeth extractions and internal medication. There was an extreme papilledema of the right side with hemorrhage on the nasal edge of the disc, the vision of the other eye was 1/400, and the pale disc was elevated 2.5 diopters.

A huge glioma of the entire left temporal lobe produced a bilateral papilledema of 3 diopters, a very vascular disc, little central vision loss and an hemiopia.

The woolen blanket appearance was found in a young man with immense choked discs caused by a frontal lobe meningioma.

Exudate on or about the disc may at times be a striking factor in the composite picture. There may be much or little; isolated spots, broad whitish yellow patches or simply perivascular stripes. In many cases the greatly swollen disc is covered by fine red dots which look like small hemorrhages, but actually are minute blood vessels. The exudate may roughly parallel the veins and be two or three times as wide as the vessels. When the exudate is extensive and remote from the disc, accompanied by hemorrhages and considerable blood vessel disease, the papilledema is usually of circulatory origin, a fact of supreme importance in prognosis, for upon it may hinge the question of operative in-

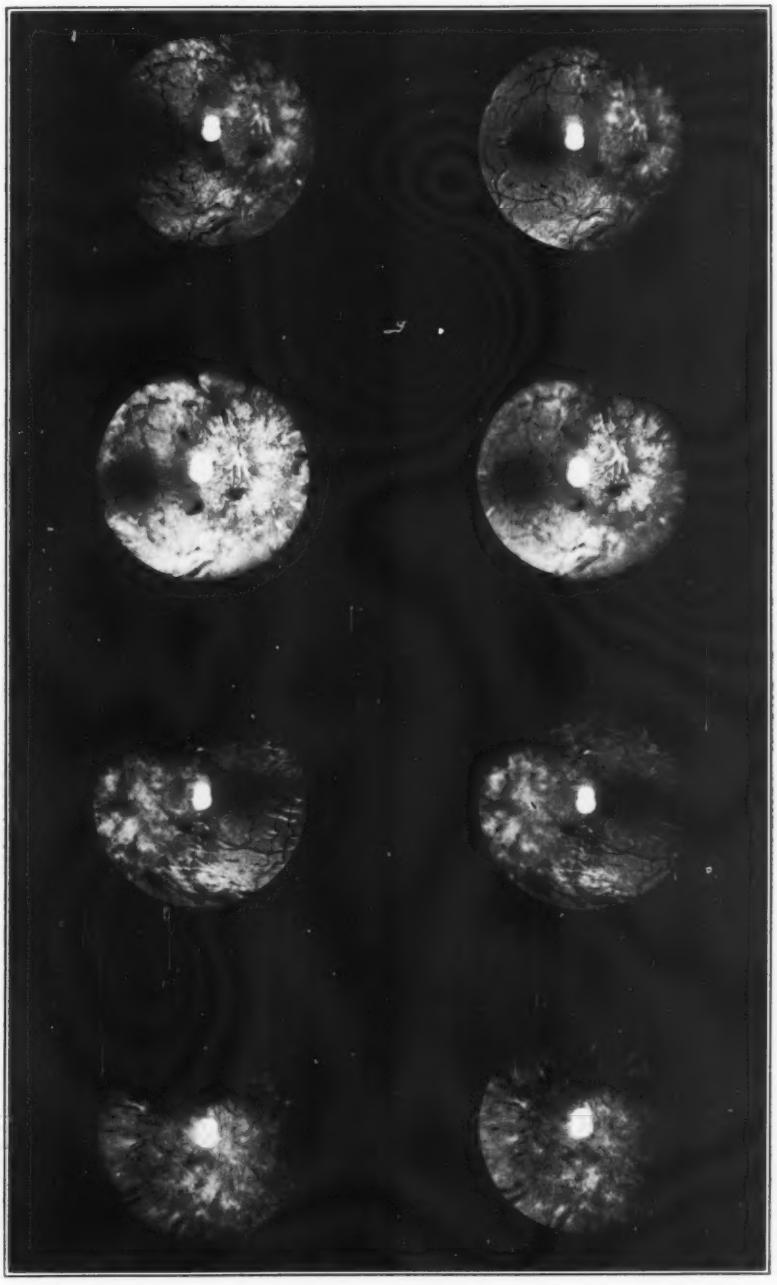


Plate II

Papilledema, "choked disc." Stereoscopic photographs (Bedell). Metastatic lymphosarcoma left frontal lobe, illustrating the degree of nerve-head swelling, the variations in the vascular supply and the hemorrhages.

tervention. In vascular states the disc may bulge forward in true mushroom shape.

As the disc swelling subsides the exudate disappears, and finally in favorable cases the disc becomes flat and the retina transparent. At other times it becomes organized over the disc and if present for a long time always forms a delicate epipapillary layer which veils the entire disc surface and may even extend over the border.

Very slight retinal edema over the disc may be the only fundus expression of intracranial disease, and although this is not a papilledema, the recognition of its nature is of considerable diagnostic significance, for it seems to occur most frequently in pituitary lesions. By comparing a disc before and after pituitary tumor evulsion, it is possible to appreciate this characteristic sign.

In expanding lesions of the orbit papilledema is frequently seen. In a giant cell sarcoma the nerve-head was elevated and covered with exudate, the veins were decidedly engorged and the arteries small. In a malignant exophthalmos, the swelling was greater, the veins were more engorged and there was very little exudate, while in an orbital abscess the swelling was almost entirely confined to the nerve and both arteries and veins were distended.

The ophthalmoscopic appearance in cases of optic neuritis varies almost as much as in those of papilledema. Some show a very slightly perceptible increase in the color and consistency of the disc, while in the most extreme grades there is great swelling, complete obscuration of the disc, distended veins and exudate along the vessels and about the macula. The swelling is irregular in outline, the border is frayed, and the central excavation and papillomacular bundle are often indistinguishable. In the high grade elevations the overlying vitreous is frequently hazy and recognized by diminished transparency showing as a gray ring where the transmitted light is reflected from its surface. This appearance was well illustrated in a patient with unilateral optic neuritis resulting from lead poisoning. Under appropriate treatment the swelling disappeared, but a veil persisted. In unilateral syphilitic neuritis this is clearly demonstrated. In the less intense inflammations of the nerve, such as those found in the early stages of multiple sclerosis, there is a slight but general haze of the retina with some swelling over the nasal side of the disc with full retinal vessels. These signs are of importance in the early case of retrobulbar neuritis.

When optic neuritis is ushered in with a rapid loss of vision and a large central scotoma there is an elevated rounded disc with immense dilatation of the retinal veins, narrow arteries and cloudy retina with vitreous opacities, and when they respond to treatment a definite prepapillary membrane remains. The disc elevation may measure several diopters and the vision be greatly reduced. After the signs of inflammation have disappeared a small central scotoma persists. One of the most important signs of this inflammation is the infiltration of the vitreous, which shows as fine dust opacities in the posterior layers.

Certain types of papilledema and papillitis seem to be similar in ophthalmoscopic appearance. These are found in early severe neuritis with sudden loss of vision and field defect and in the slow, mild, symptomless papilledema. The ordinary ophthalmoscopic examination does not seem to be sufficient to distinguish between them. But fortunately for the physician, the inflammations are so intense that by the early vision signs differentiation is possible.

It seems unwise to follow the textbook rule that when the disc is only slightly elevated the diagnosis is papillitis, and that when the swelling is great it is papilledema, for this is not substantiated clinically. In the early stages of papilledema there is a low degree of swelling and often in the extreme fulminating type of optic neuritis the elevation is highest. It is probable that the vascularization is greater and the hemorrhages more frequent in choked disc than in optic neuritis.

If the use of the term papilledema is limited as we have suggested, to the swelling of the nerve-head, then we can exclude at the bedside the large group with hypertension retinitis where the swelling of the disc is part of the general involvement of the retina. To illustrate this point, a patient with prolonged hypertension and severe headache who had a bilateral retinal edema was, in spite of my warning, operated upon for a non-existent brain tumor. The importance of understanding the blood vessel changes and the subsequent edema of the entire fundus is evident to all.

It is an unskillful physician who subjects a frank hypertensive with retinal edema and vascular alterations to a brain operation, when all the signs and symptoms can be readily explained

Plate III

Papilledema, "choked disc." Stereoscopic photographs (Bedell).

Fig. 1. Pituitary adenoma. Right eye. Fig. 3. Glioma of the entire left temporal lobe. Left eye.
Fig. 2. Left eye same patient. Fig. 4. Right eye of the same patient.

by the vascular state. Ophthalmologists are often confronted with this problem and the many which arise from it. The obligation to the patient is great.

In practice, some cases of papilledema are recognized late in the course of the disease and, therefore, the patient is subjected to unnecessary suffering or even death. If all cases of nerve-head swelling are considered to be the result of increased intracranial pressure until proven otherwise, more will come under treatment earlier and more good results will follow intracranial operations.

Before anyone renders an opinion as to whether the optic nerve change is a congenital abnormality, a papilledema or a papillitis, it is necessary for him to have a clear mental picture of the changes that may take place in the nerve-head, the variations in the swelling of the disc which depends upon edema and the localized or general inflammatory changes. The value of examination with the red and the red-free light and the clinical significance of opacities in the posterior vitreous cannot be over-emphasized. With more care in the use of modern instruments, stereoscopic fundus photographs and a clearer conception of the underlying pathological changes an accurate diagnosis will be made.

SUMMARY

A plea is made for more careful ophthalmoscopic examinations, for the separation of the simple edema of the retina from that confined to the disc and contiguous parts, and from that which results from an inflammatory process. It is not especially difficult to understand why in some hyperopes and some myopes the retina bulges over the nerve-head to give the effect of actual nerve swelling, nor is it hard to recognize the process which leads to the inflammation of the optic nerve either by direct infection or remote toxic action. It is, however, a genuine task to comprehend why some cases of intracranial neoplasm show one type of papilledema and others produce entirely different ones. Clinicians must analyze the history, appreciate the ophthalmoscopic signs and correlate the pathological findings if we are to emerge from the darkness which now enshrouds these difficult problems. There are, however, several luminous signs which, if we realize their import, will materially help in the solution of the individual case. As physicians we must be more meticulous in our reports, and when widespread extensive retinal changes are evident, we should speak of retinitis rather than papilledema or papillitis.

The triad of signs and symptoms; fundus changes, field alterations and visual defects, must always be constantly before us when we attempt to make the diagnosis of a congenital change, an edema or an inflammation. When the term papilledema is restricted to the nerve-head, a long step will be taken along the road toward the goal of earlier diagnosis and more efficient care. And, finally, if we are to raise a standard to which all students may repair for consultation and verification, fundus photographs must accompany all discussions on these subjects.

BENIGN LESIONS OF THE BREAST DIAGNOSED AND TREATED AS CARCINOMA*

By DAVID R. MURPHEY, JR., M.D.
Tampa, Florida

All cases diagnosed and treated as carcinoma of the breast in the University of Virginia Hospital from 1905 to 1928 were reviewed in a report[1] published in 1934. In preparing this report, the pathologic material, obtained by reference to the diagnostic index of the pathologic collection, was studied without knowledge of the clinical data or of the actual fact of survival or death in any case. There were 152 original diagnoses of carcinoma; 17 (11.8 per cent) of these were considered benign at the time of this report. Of the entire group, 63 could be adequately followed, and of these 8 (12.5 per cent) belonged to the group of 17 considered benign. The present report presents a clinical and pathologic review of 7 of these 8 cases. The eighth has been omitted on account of histologic material inadequate for photomicrographic reproduction.

At the time of the original report it was felt that at least some of the changes in pathologic diagnosis resulting from the new study of the material were the result of an improvement in the pathologist's understanding of borderline lesions. That this increase in understanding is a phenomenon of rather general application is

---

*Read in Section on Surgery, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Surgery and Gynecology and the McIntire Tumor Clinic, University of Virginia Department of Medicine, Charlottesville.

indicated by a similar study presented by Bloodgood[2] in 1932. He reported in this study the submission of borderline material to numerous pathologists in 1915 and again later. His comment on the results was as follows:

"These sections" (referring to the material in which the diagnosis was reversed) "and others were submitted to numerous pathologists in 1915, the majority of whom diagnosed the borderline lesions as malignant. In the microscopic demonstrations in the surgical pathological laboratory in the Johns Hopkins Hospital in June and December, 1930, and April, 1931, the majority reversed the decision of the former group and rendered a diagnosis of benign growth."

All the original pathologic diagnoses made on the present material were by well trained pathologists in a university department, and, except for possible error in some cases on the part of the individual making the pathologic study, probably represent the knowledge of breast pathology current at the time the diagnoses were made.

In the 1934 study, after the new pathologic diagnoses were completed, an attempt was made to correlate them with the clinical data and the late result. Although not definite proof that these later diagnoses were correct, it seems somewhat significant that of the 8 cases followed all were alive at the end of five years except one that died as the result of an operative infection.

CASE REPORTS

Case 1.—Clinical Data: Mrs. W. F. R., a white woman, aged 37 years, was first seen in the University of Virginia Hospital in 1918, complaining of a lump in the breast. For a number of years she had noticed a mass near the left axilla that varied greatly in size, at times completely disappearing. Her last child was at this time twelve months of age and had nursed from this breast until a short time previously. The mass was excised by her family physician and sent to another laboratory for pathologic diagnosis. A diagnosis of adenocarcinoma was made and the patient was referred to the University Hospital. Physical examination revealed over the axillary portion of the left breast a healed, indurated scar 8 cm. long. There were no masses, and no enlarged lymph nodes were felt.

Original Pathologic Diagnosis (1918) (re-examination of material obtained from laboratory where it was originally examined).—Adenocarcinoma.

Treatment.—Radical mastectomy.

Recent Pathologic Diagnosis (without knowledge of history or result): lactation hypertrophy with acute and chronic mastitis (*Fig. 1*).

Result.—Well 16 years.

Case 2.—Clinical Data: V. M., a colored woman, aged 60 years, entered the University of Virginia Hospital in 1920, complaining of "breast trouble." Fifteen years before admission, about the time of the menopause, she had developed a copious sero-sanguinous discharge from the right nipple. Six months before admission, she had developed an ulceration of the breast, which she attributed to cooking over a hot stove. Examination revealed on the right breast, about two inches lateral to and slightly above the nipple, two discharging sinuses. The openings were about 0.5 cm. in diameter, with slightly undermined edges. Exuding from the sinuses was a dark brown, thick fluid. The lateral portion of the breast was diffusely nodular, but not hard, and was slightly tender to pressure. There was neither fixation nor thickening of the skin, and the breast moved freely over the chest wall. Several enlarged lymph nodes were palpable in the right axilla. A clinical diagnosis of cystadenoma of the breast, undergoing malignant change, was made.

Original Pathologic Diagnosis (1920 operative specimen)—Adenocarcinoma.

Treatment.—Radical mastectomy.

Recent Pathologic Diagnosis (without knowledge of history or result).—Benign papilloma (*Fig. 2*).

Result.—Died of wound infection (16 days).

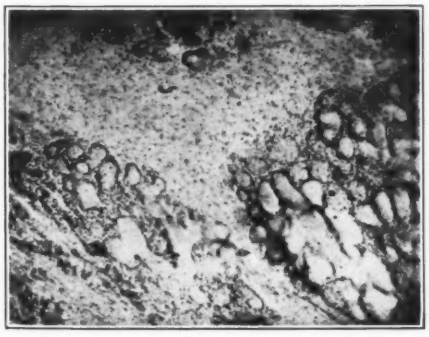


Fig. 1

Case 1.—Low power photomicrograph showing a residual lactation hypertrophy. This area shows a moderate infiltration of the stroma with lymphocytes and polymorphonuclear leukocytes. There are no mitotic figures and no tendency for the epithelium to invade the stroma.

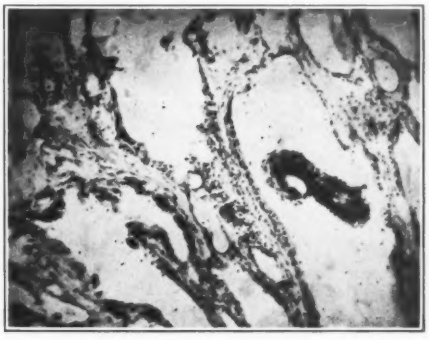


Fig. 2

Case 2.—Low power photomicrograph showing a benign papilloma. The previous diagnosis in this case was adenocarcinoma. The epithelium is uniform in size, shape and staining reaction without mitotic figures and without tendency to invade the stroma.

Case 3.—Clinical Data: Mrs. J. M. B., a white woman, aged 30 years, entered the hospital in 1923 complaining that something was wrong with her left breast. One year before admission, during early pregnancy, she had noticed a swelling of the left breast associated with pain and redness. After two days this had spontaneously regressed. Shortly after the birth of her child, three months previous to admission, the left breast, lateral to the nipple, had become swollen, hard, red, and very painful. This area had been opened and a large amount of pus obtained. Soon thereafter another hard, red, tender area appeared in the upper portion of the breast. This had also been incised and purulent material obtained. Physical examination at the time of admission revealed the entire left breast swollen, firm, and tender. There was definite retraction of the nipple with fixation of the skin over the entire mass. There were two healed incisions over the breast. A clinical diagnosis of carcinoma of the breast of borderline operability was made.

Original Pathologic Diagnosis (1923 operative specimen).—Adenocarcinoma with secondary infection and abscess.

Treatment.—Radical mastectomy.

Recent Pathologic Diagnosis (without knowledge of history or result).—Lactation hypertrophy with acute mastitis and abscess formation (*Fig. 3*).

Result.—Living and well (11 years).

Case 4.—Clinical Data: Mrs. L. C. J., a white woman, aged 71 years, entered the hospital in June, 1924, complaining of a lump in the breast. For six months she had noticed a small lump in the left breast that had steadily and slowly increased in size, unassociated with pain or discharge from the nipple. Physical examination revealed a small, movable nodule beneath the nipple without attachment to the skin or underlying structures.

Original Pathologic Diagnosis (1924 frozen and permanent section of biopsy specimen).—Papillary adenocarcinoma.

Treatment.—Radical mastectomy.

Recent Pathologic Diagnosis (without knowledge of history or result).—Benign papilloma (*Fig. 4*).

Result.—Living and well (10 years).

Case 5.—Clinical Data: Mrs. I. B. M., a white woman, aged 34 years, was admitted to the hospital in 1927, complaining of a lump in the breast. For about six years she had noticed a small nodule in the right breast that had slowly increased in size, associated with a sticking pain. On examination, a tumor 2 cm. in diameter was found in the left breast. This was freely movable and unattached to the skin. A clinical diagnosis of adenofibroma was made. The patient was advised to have a local excision of the tumor, which was done.

Original Pathologic Diagnosis (1927 biopsy).—Intracystic papillary adenocarcinoma.

Treatment.—Radical mastectomy.

Recent Pathologic Diagnosis (without knowledge of history or result).—Chronic cystic mastitis with duct papilloma and adenoma (*Fig. 5*)

Result.—Living and well (7 years).

Case 6.—Clinical Data: Mrs. S. S., a white woman, aged 50 years, entered the hospital in 1927, complaining of a lump in the right breast. Eighteen months prior to admission, she had noticed a lump in the right breast associated with pain and a burning sensation. There had been a definite variation in size of the tumor, so great that at times it had entirely disappeared. Just prior to the disappearance of the mass there had always been a thick, yellow discharge from the nipple. The tumor had been definitely larger during the menses. Examination revealed the right breast to be small and flat and the nipple large. On pressure a thick sanguinous fluid exuded from the nipple. There were many small masses beneath the nipple, which were not attached to the skin or chest wall.

Original Pathologic Diagnosis (1927 biopsy).—Intracystic papillary adenocarcinoma.

Treatment.—Local excision of large portion of the breast, including the nipple.

Fig. 3

Case 3.—Low power photomicrograph of lactation hypertrophy with acute mastitis and abscess formation. The original diagnosis rendered in this case was adenocarcinoma with secondary infection and abscess formation. The section shows a portion of an abscess and parts of three hypertrophied breast lobules heavily infiltrated with lymphocytes and polymorphonuclear leukocytes. The epithelium shows no anaplastic tendencies.

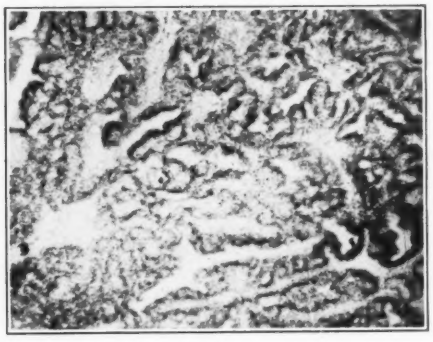


Fig. 4

Case 4.—Section of benign papilloma previously diagnosed and treated as papillary adenocarcinoma of the breast. The section is very cellular. The cells were hyperplastic, but not anaplastic. There is no invasion of the stroma by the epithelium. The cells are uniform in size and mitotic figures are not present.

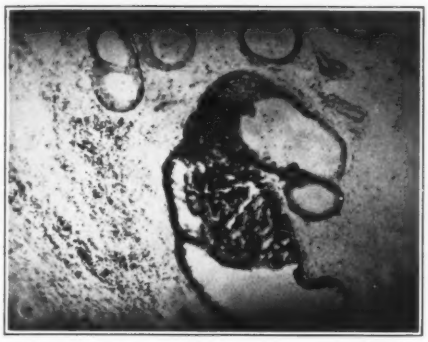


Fig. 5

Case 5.—Low power photomicrograph of section of chronic cystic mastitis originally diagnosed as intracystic papillary adenocarcinoma. The structure of the papilloma is identical with that of papillomata frequently found in sections of chronic cystic mastitis. The cells are not anaplastic and are confined to the cyst without evidence of invasion. There is a lymphocytic infiltration of the stroma surrounding the cyst.

Recent Pathtologic Diagnosis (without knowledge of history or result).—Chronic cystic mastitis with cysts and duct papillomata (*Fig. 6*).

Result.—Living and well (7 years).

Case 7.—Clinical Data: Mrs. A. M., a white woman, aged 42 years, was admitted to the hospital in 1927, complaining of a lump in her left breast. Three weeks before admission, shortly after weaning her last child, a lump about the size of a lemon had appeared in the left breast. This mass had been freely movable and associated with pain on exertion. Since that time, the tumor had decreased progressively in size, and at the time of admission was only 4 cm. in diameter. Examination revealed a small, firm, movable lump in the left breast, slightly tender and unattached to the skin.

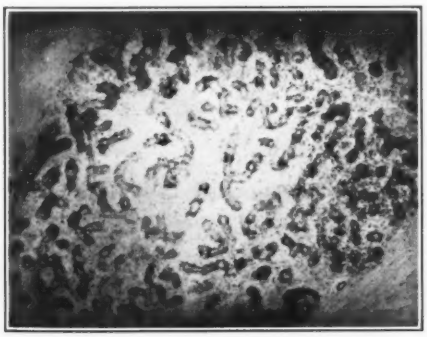


Fig. 6

Case 6.—Low power photomicrograph of a case of chronic cystic mastitis previously diagnosed as intracystic papillary adenocarcinoma. This portion of the section is through one of the adenomatous areas. The cysts and papillomata were similar in structure to that shown in Fig. 5. There is obviously more epithelium present in this section than is normally found in a woman fifty years of age. The epithelium is normal in character without invasive tendencies.

Original Pathologic Diagnosis (1927 biopsy).—On frozen section, carcinoma. On permanent section, duct cell carcinoma with acute and chronic mastitis.

Treatment.—Radical mastectomy.

Recent Pathologic Diagnosis (without knowledge of history or result).—Residual lactation hypertrophy with acute and chronic mastitis (*Fig. 7*).

Result.—Living and well (7 years).

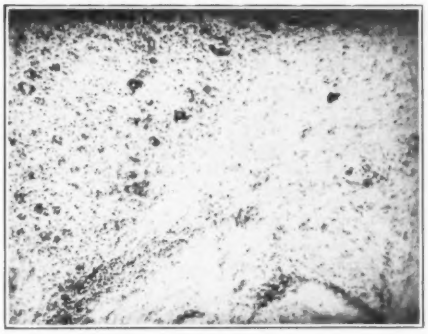


Fig. 7

Case 7.—Low power photomicrograph of case of residual lactation hypertrophy diagnosed and treated as duct carcinoma. This area does not show the lactation hypertrophy which was definite in other portions of the slide. This area shows an infiltration of an atrophying lobule with round cells. There were also abscesses in other portions of the section.

COMMENT

The breast is an organ that normally undergoes extensive changes from birth to old age. The male and female breasts are identical until puberty, at which time the female organ hypertrophies. The post-puberty female breast is not an anatomically fixed structure but responds with varying degrees of hyperplasia at each menstrual cycle. In case of pregnancy the usual inter-menstrual atrophy does not occur. On the contrary, the hyperplasia continues throughout pregnancy until after delivery, at which time lactation begins. After the climacteric there is progressive atrophy of the glandular elements. The senile breast is composed mostly of fat with a small amount of fibrous tissue and a few remaining ducts. It is essential that the pathologist understand these physiologic changes if errors are to be avoided in the interpretation of pathologic material.

Three of the cases reviewed had lactating breasts. The recent microscopic diagnosis of lactation in each instance was confirmed by the history. These cases were originally diagnosed and treated as adenocarcinoma with secondary infection. There is no mention of lactation hy-

pertrophy. Had it been recognized as such it would almost certainly have been included in the diagnosis, since the associated infections were recognized and so designated. The hyperplasia of the lactating epithelium was apparently mistaken for carcinoma.

Two of the cases presented were re-diagnosed as chronic cystic mastitis with duct papilloma. Chronic cystic mastitis is characterized by increase in fibrous tissue, round cell infiltration, and hyperplasia of the epithelial elements as manifested by an increase in the number of acini, an increase in the number of cells lining the acini, and the presence of cysts which may or may not contain papillomata. These two cases were originally diagnosed as intra-cystic papillary adenocarcinoma. Careful examination of the cells composing the papillomata failed to reveal any tendency toward anaplasia; the cells showed no tendency to invade and mitotic figures were absent.

One of the most difficult lesions of the breast to differentiate from cancer is the very cellular papilloma. Two cases were re-diagnosed as benign papilloma on the basis of cell morphology and lack of invasion. These two cases had been previously diagnosed as adenocarcinoma and papillary adenocarcinoma, respectively. One of these lesions, while very cellular, showed no morphologic changes other than hyperplasia. The other did not differ from the ordinary papilloma of the breast. The error in the original diagnosis was the result of confusing hyperplastic and anaplastic changes.

These cases have been presented in an effort to lower the incidence of needless mutilating operations in benign lesions of the breast erroneously diagnosed as carcinoma.

The quick section method of pathologic examination is used extensively in lesions of the breast. When employed as a check on a tumor typically malignant, both clinically and on gross pathologic examination, it is a useful procedure. This method should be regarded as merely a laboratory aid and not as a final opinion. In those cases atypical clinically and on macroscopic examination, the quick section also usually presents an atypical appearance. In such cases it is probably less radical to withhold radical mastectomy until permanent sections are available than to subject the patient to a possibly needless mutilating operation. Certainly, even with the double advantage of a good section and modern knowledge of breast physiology and pathology, unnecessary radical operative procedures may still occasionally be performed.

BIBLIOGRAPHY

1. Gentile, A.; Murphey, D. R., Jr.; and Lehman, E. P.: Carcinoma of the Breast: A Statistical Fallacy. Amer. Jour. Surg., New Series, **25**:91-96, 1934.
2. Bloodgood, J. C.: Borderline Breast Tumors. Encapsulated and Non-Encapsulated Cystic Adenomata, Observed from 1890 to 1931. Amer. Jour. Cancer, **16**:103-176, 1932.

DISCUSSION (*Abstract*)

Dr. Dean Lewis, Baltimore, Md.—The paper just presented indicates some of the difficulties encountered in the differential diagnosis of breast lesion. The acinar epithelial proliferation occurring in Schimmelbusch's disease is at times non-encapsulated, but no difficulties should be encountered in differentiating this lesion microscopically from carcinoma.

The differentiation clinically between plasma cell mastitis and a diffuse carcinoma of the breast is at times very difficult. Not long ago I saw a woman 29 years of age, in whom the right breast was involved. A history dating back six months was given. The lesion looked like a rapidly growing carcinoma which involved the whole breast. The skin, of a typical pigskin appearance, was adherent. The pectoral set of lymph nodes was involved, and one extended over the edge of the pectoralis major. Before doing a radical removal I suggested that a course of preoperative radiation be given. Forty eight hours after this was begun the temperature rose to 104° F. Softening occurred rapidly, and an abscess formed, which was drained. The patient has remained well. If I should see such a case tomorrow, I should not be able to make a differential diagnosis. I should advise x-ray, for I believe that the changes which may occur, as in the case just cited, may enable one to make a differential diagnosis. I think that it has been the experience of almost every clinic that as material has been restudied a few cases formerly regarded as malignant have been placed in the benign group.

Dr. George A. Stewart, Baltimore, Md.—Again we have had our attention called to the group of borderline breast tumors. This group is becoming increasingly important as the educational crusade is bringing in its harvest of early breast tumors. These cases are not easy to diagnose and the responsibility upon the surgeon is great. On the one hand if the tumor is benign he may perform an unnecessary mutilating operation, or on the other hand he may fail to perform the necessary complete one if it is malignant.

Dr. Murphey has mentioned Dr. Joseph Colt Bloodgood's group of cases submitted to a large number of pathologists in 1915. These same cases have been presented to other groups for diagnosis from time to time and the important thing to be noticed is that now more and more of these cases formerly diagnosed as malignant are diagnosed benign. This means, without a doubt, a keener understanding and interpretation of the pathological picture. This later diagnosis of benign conforms to our follow-up studies from 1915 to the present time.

We should continually study and restudy these borderline cases. In conjunction with this careful study of the microscopic picture, which of course is done after the operation has been performed, may I empha-

size the importance of a preoperative careful history and a thorough examination, and a gross and microscopic study at the time of operation.

In our effort to avoid the unnecessary mutilating operation the biopsy is of inestimable value. For example: should there be a question as to diagnosis, the tumor with a fair margin of normal breast tissue can be removed, and as soon as a frozen section shows any doubt as to diagnosis the incision can be sutured and radiation be applied immediately to the axillary region, followed in a few days by radiation of the breast. A permanent section can be made and submitted to several pathologists, and if the majority confirm malignancy the complete operation should be done. This procedure, it has been shown in our cases, does not lessen the patient's percentage chance for recovery.

May I repeat that constant restudy by the students in medical school and physicians in postgraduate courses of the history, examination, pathology, and follow-up as a unit is the way to help clear up this very important and puzzling group of breast tumors, the borderline tumors.

SARCOMA OF THE GALLBLADDER*

REPORT OF A CASE

By LUCIEN Y. DYRENFORTH, M. D., M. S.
and
EDWARD JELKS, M.D.
Jacksonville, Florida

The literature through 1935 contains 34 cases reported directly or indirectly as primary sarcoma of the gallbladder. Of this number 30 may be considered authentic, or at least as having enough description of the microscopic pathology in each instance to warrant agreement with the author's diagnosis. This selection agrees more or less with the ideas on the subject of others who have gone through the literature.

The condition represents such a well defined entity in gallbladder malignancy that it was thought to warrant a compilation of the known case studies on record and a list of the more important literature, which as yet is lacking in English. In addition we are adding one more case. Most of the data on the case reports prior to 1931 were taken from the articles of deGaetani[7] and Triggiani,[8] with later items added.

While the most outstanding feature is the prevalence of the spindle cell type of tumor, often accompanied by giant cells, other types reported have been polymorphic cell sarcoma, angiosarcoma and myosarcoma. Two types have been reported which suggest metaplasia, one, a periosteal variety and another a myxo-chondro-osteoid form.

The list of case reports of sarcoma of the gallbladder analyzed by deGaetani is given by him in tabular outline, with important clinical notations through 1931, and he adds a case of his own.

Romani's[9] case (1932) was something like ours, in that the contents of the gallbladder had undergone coagulation necrosis and, as in our case, identification of the tumor was made from a piece of the excised gallbladder wall, an autopsy not being obtained. This author also gives a detailed study of each previously reported case.

Moura (1932) reports a primary polymorphic cell type of primary sarcoma of the gallbladder along with one of primary carcinoma.

Triggiani (1934) confirms the rarity of primary mesenchymal tumors of the gallbladder and in addition to the remarks which seem to be agreed to by all, makes the observation that the histologic character of these growths does not always permit a classification on a basis of histogenesis, due partly to the obscurity of origin of certain cell types. Some of this obscurity he believes is due to polymorphism in different places, and to the disposition of the elements of the tumor; thus, in the case he cites there are differing structures in single nodules, round cell arrangement as in lymphosarcoma, spindle cell types as in blastomas originating in the fibrous tissue, and with perithelial characters as in tumors whose matrix is represented by adventitial elements. These observations lead him to apply the term immature mesenchymal blastoma as best describing such polymorphism.

Erdmann (1935) reports a large tumor the size of a grapefruit, spindle cell type, in a woman of 52 years.

CASE REPORT

Mrs. H. P., white widow, aged 72, was admitted to the hospital in January, 1936. She noticed a mass in the right upper abdomen seven weeks before, movable and tender, and accompanied by a dull, aching pain. Slight fever was present irregularly. Three weeks before entrance the swelling enlarged to the size of a grapefruit from a mass half that size. There was no jaundice. The family history was negative for malignancy and tuberculosis. The patient has two children now middle-aged. Her general health was previously good. Examination showed a moderately sick-looking, small, elderly woman. Temperature was 99° F., face slightly flushed. A systolic murmur was heard over the precordium and occasional extrasystoles were present. With the patient lying on her back a swelling was seen in the right abdomen, above the level of the

*Received for publication April 30, 1936.

*From the Laboratory of Surgical Pathology, Riverside Hospital, Jacksonvil.e, Florida.

umbilicus and extending to the iliac crest. The mass felt smooth, was tender, and seemed to be fluctuant. It gave the impression of being fused with the liver margin. On bimanual palpation it moved medially, and there was little extension backward into the lumbar region. No lymph nodes were palpable. Because of a history of movable kidney, retrograde pyelograms were made, but no kidney disease was in evidence. The roentgenologist, Dr. W. M. Shaw, reported stones in the gallbladder and a large soft mass in the upper right abdomen. At operation there appeared in this area a purple swollen mass 7 x 15 cm., with large dilated blood vessels coursing over its surface. It was attached only from above, where it was continuous with the liver. Its consistency was soft and elastic. While being explored one end tore open about a centimeter, and from this rent a pale granular material oozed, followed later by thick yellow purulent matter and reddish fluid, about 6 ounces in all. These contents were under tension and surrounded by a 1.5 cm., thick layer of the granular matter. The posterior abdominal wall was not examined. From the interior of the mass several large faceted brownish stones were removed, and when the last was dislodged from its bed, deep in the cavity, yellowish brown bile welled up. The abdomen was closed with drainage. The postoperative opinion was "probable carcinoma" and cholelithiasis. The patient failed to rally from the operation. An autopsy was not obtained.

Microscopic sections made from pieces of the gallbladder wall and contents reveal a cellular fibrosarcoma, rich in nuclear figures, and showing a great amount of necrosis. In the low-power photomicrograph showing both sides of the gallbladder wall, the remnants of submucosa can be made out, with granulation

TABLE LISTING THE REPORTED CASES OF SARCOMA OF THE GALLBLADDER

No.	Author		Age and Sex		Histologic Type	Other Findings
1.	Ingalls	1887	55	f.	Spindle cells, giant cells	Calculi, metastases
2.	Boutwell and Ford	1879	64	f.	Spindle cells	Icterus, metastases
3.	Destree	1881	?	m.	Spindle cells	Chronic cholecystitis, metastases
4.	Seibert	1882	52	f.	Spindle cells	
5.	Klingel	1889	?	?	Angiosarcoma	Granular tumor, 48 stones, surgery, autopsy
6.	Griffin and Segal	1897	76	f.	Spindle cell	Calculi, metastases
7.	Newjadomski	1900	?	?	Polymorphic cell	Calculi, metastases
8.	Landsteiner	1904	68	m.	Spindle cell, myosarcoma	Large necrotic gallbladder, metastases, surgery
9.	Ibid	1907	?	?	Myosarcoma	Calculi, combined myosarcoma and carcinoma with hyaline and calcific changes resembling periosteal sarcoma
10.	Dialti	1908	60	f.	Spindle cell	Icterus, fever, surgery, necrosis, autopsy
11.	Parlaveccio	1908	59	m.	Spindle cell	Large gallbladder
12.	Bayer	1909	59	f.	Spindle cell, giant cell	Large gallbladder, icterus, calculi, metastases
13.	Ibid	1909	65	f.	Spindle cell, giant cell	Icterus and colic, surgery, calculi, metastases
14.	Hotes	1910	52	f.	Spindle cells, giant cells	Spindle and giant cells with adenoma of Luschka glands and zone of myxo-chondro-osteoid change, calculi, diffuse abdominal and thorac-metastases
15.	Cathcart	1911	45	m.	Spindle cells, giant cells	Cholecystitis, surgery
16.	Schoenblank	1914	42	f.	Polymorphic and giant cells	Calculi, colic
17.	Iwasaki	1915	52	f.	Spindle and giant cells	Necrotic neoplasm, surgery
18.	Carson and Smith	1915	38	f.	Spindle cells	Calculi, surgery
19.	Jaffe	1918	45	m.	Polymorphic and giant cells	Pain and fever, calculi, metastases
20.	Della Valle	1920	68	m.		Ulcerative type, calculi, autopsy
21.	Ibid	1920	63	f.	Round cells	Icterus, surgery, metastases
22.	Ibid	1920	?	?	Polymorphic and giant cells	Biopsy, calculi
23.	Kleinkneght, Nessmann and Oberling	1931	69	f.	Spindle cells	Pain, metastases, autopsy. Zone of epitheliomatous aspects, similar in the hepatic metastases
24.	Stickdorm	1931	59	f.	Chondrosarcoma	Calculi
25.	Brunschwig	1931	55	f.	Spindle and giant cells	Pain, distention, icterus, surgery
26.	deGaetani	1932	82	f.	Spindle cells	Calculi, cachexia, metastases
27.	Romani	1932	60	f.	Spindle cells	Calculi, coagulation
28.	Moura	1932	68	f.	Polymorphic cells	Calculi
29.	Triggiani	1934	68	f.	Spindle cells	Calculi, metastases
30.	Erdmann	1935	52	f.	Spindle cells	Five large stones, tumor of grapefruit size

tissue and necrotic debris. The adventitial surface is involved in the neoplastic process, whence the tumor sprang, probably influenced by the presence of stones embedded deep in the wall (*Figs. 1* and *2*).

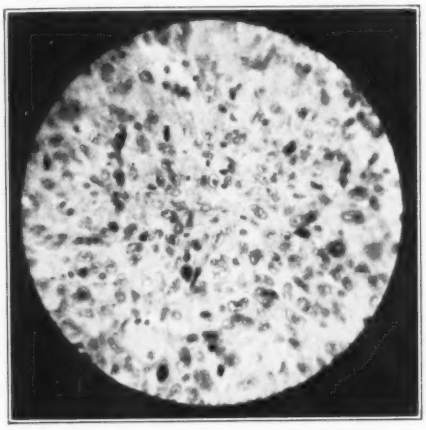


Fig. 1
Richly cellular portion of tumor with mitotic figures (x970).

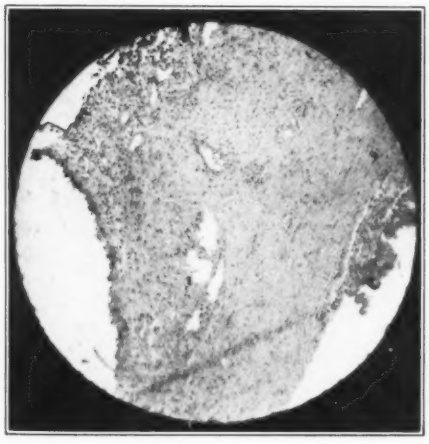


Fig. 2
The left-hand edge contains remnants of the mucosa (x100).

DISCUSSION

Those reporting upon primary sarcoma of the gallbladder are uniformly convinced of the strikingly similar points in most cases, namely, the constancy of an accompanying cholelithiasis (21 cases out of 31 definitely referring to stones), the prevalence of the fusocellular type of sarcoma (21 out of 31), and the definitely higher incidence in cancer-age females (21 out of 31, with 4 sexes unstated). The average age was 58, varying from 32 to 82.

The condition is rarely diagnosed preoperatively. It is apparently uniformly fatal, although Moura thinks that complete removal with partial hepatectomy might prove successful in some cases.

The rarity of malignancy is noted by Della Valle, who found in 23,665 necropsies, 3 sarcomas and 13 epithelial tumors. Jaffe states that among 27 malignant tumors of the gallbladder coming to autopsy at the Cook County Hospital, Chicago, in the last seven years, there was one primary fibrosarcoma.

We wish to acknowledge the kindly assistance and helpful comments of Dr. Richard H. Jaffe, director of the pathological laboratories of Cook County Hospital, Chicago.

SUMMARY AND CONCLUSIONS

Primary sarcoma of the gallbladder is a rare malignancy of definite and constant histogenesis and of uniform appearance. It is highly fatal, occurs chiefly in cancer-age females and is commonly accompanied by gallstones.

A case of primary sarcoma of the gallbladder is reported, and a review of cases in the literature made.

BIBLIOGRAPHY

1. Parlaveccio, A.: A Case of Primary Sarcoma in an Emphyesmatous Gallbladder. Arch. f. klin. Chir., **87**:365, 1908.
2. Cathcart, A.: Primary Sarcoma of the Gallbladder. Jour. Sou. Surg. & Gyn. Soc. (Dec.) 1911.
3. Jaffe, R. H.: Primary Sarcoma of the Gallbladder. Zentralbl. f. Path., **29**:571, 1918. Also private communication.
4. Goldstein, J.: Primary Sarcoma of the Gallbladder. Amer. Jour. Surg., **35**:351, 1921.
5. Magoun, J. A. H.; and Renshaw, K.: Malignant Neoplasms of the Gallbladder. Ann. Surg., **68**:348, 1921.
6. Brunschwig, A.: Primary Sarcoma of the Gallbladder. J.A.M.A., **96**:680, 1931.
7. deGaetani, G.: Contribution to the Study of Sarcoma of the Gallbladder. Pathologica, **24**:541, 1932 (very complete bibliography).
8. Triggiani, A.: Primary Mesenchymal Tumors of the Gallbladder. Sperimentale Arch. di Biol. norm. e path., **88**: 615, 1934 (fine review).
9. Romani, A.: Primary Sarcoma of the Gallbladder. Boll. e men. Soc. piemontese di chir., **2**:1062, 1932.
10. Erdmann, J. F.: Malignancy of the Gallbladder. Ann. Surg., **101**:1139, 1935.

NEOPLASMS OF THE DIGESTIVE TRACT*

By THOMAS R. BROWN, M.D.
Baltimore, Maryland

An intensive study of digestive diseases and digestive problems, over a long period of years, should have, and I believe has, taught us many things. It has taught us, for instance, that this field can never be a narrow specialty. Its connections, anatomical, nervous, vascular, are so intimate with the cardiovascular and respiratory systems above, urinary and genital systems below, that we are constantly finding pathologic conditions in one field with symptoms spilling over into another. These referred symptoms may be the major, sometimes the only, symptoms: The acute upper abdominal picture of certain cases of coronary thrombosis or of central pneumonia; the ulcer-like syndrome of urinary calculus; the symptoms of appendicitis due to right sided pyelitits or salpingitis; the stenocardial syndrome, very occasionally met with as the only symptom of an unrecognized cholelithiasis, and the frequent examples within the abdominal cavity where disease may be in one locality, the symptoms referred elsewhere. Examples of this are the nocturnal flatulent dyspepsia of gallbladder disease and the ulcer-like syndrome sometimes met with in appendicitis.

It has taught us that in this field at least surgery is a two-edged sword, for, while brilliantly successful in the acute abdomen, it is often woefully disappointing in chronic abdominal conditions, notably chronic cholecystitis, peptic ulcer without obstruction and so-called chronic appendicitis, and it is wise to remember that the more clearcut the picture, the more definite the findings, the more imperative the operative need, the more successful will be the results obtained.

If operation is indicated, it has taught us that in gallbladder surgery, cholecystectomy is not the only operation, but there is still a place for cholecystostomy and anastomosis between gallbladder and stomach and duodenum, notably in those cases where there is extensive associated disease in the liver and in entire biliary tree, while in the case of peptic ulcer, a narrowing field as regards surgical attack, we have found that the best results are obtained after plastic operations or small resections, that gastro-enterostomy, while brilliantly successful in the grossly obstructed ulcer, is disappointing in the non-obstructive group and does not lessen the tendency to hemorrhage, while large or sub-total resections for duodenal ulcer have seemed to us absolutely unjustifiable.

It has left us still in doubt as regards the etiology of peptic ulcer and ulcerative colitis because we have not been persuaded that the former is only an incident in the life of gastritis or that the latter is due to a specific diplobacillus.

It has made us extremely skeptical of the myriad new treatments suggested, whether the medication be given through nasal or duodenal tube, in the vein or under the skin, and it has taught us that facts and fundamentals are still of far greater importance than fads and fancies.

Finally, it has made us feel that there is still no royal road to diagnosis in this field, that no laboratory test, however refined, no x-ray photograph, however skillfully taken, can supplant a careful history and a thorough physical examination, and that skillful palpation and precise percussion are far more helpful than chronic deflation, technical exploitation and premature discussion.

After all, this is still a field of mystery and difficulty, a field where every procedure must be utilized, a field where there is no place for those most dangerous words in medicine "always" or "never."

What has it taught us about the most important of all digestive problems, malignant new growths of the digestive tract? We have learned a little; there is still a great, great deal to be learned. For example, we have found that neoplasms of the digestive field are commoner than of any other field, that there seems to be a definite increase, and this seems to us to be both apparent and real: apparent because our diagnostic methods are constantly improving and real because we are living longer than we did fifty or even twenty-five years ago and cancer is a disease of later life. Perhaps there is also something in our modern civilization, in the potential traumata to which we are daily exposed, which may also play a role in this increase.

We have learned that cancer is very unevenly distributed in the digestive tract, very common in the stomach, large bowel, colon, sigmoid, and rectum; not so common but frequently met with

*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

in the esophagus; extremely uncommon in the small intestine.

In a large series of malignancies of the digestive tract, recently reported, there were 2,600 cases of cancer of the stomach, 2,700 cases of cancer of the entire large bowel, including the rectum, but only 30 cases of neoplasm of the small gut.

This great rarity of small intestinal neoplasms is very fortunate, for it is practically impossible to diagnose these cases sufficiently early to make surgical resection possible.

We know no means of preventing the development of new growths in the digestive tract, for, after all, prevention is dependent upon etiology. In the digestive field at least, our knowledge of the primary cause of new growths is practically nil. Clinical studies in other fields, experimental and statistical studies both in human beings and animals, show that heredity, trauma, mechanical, chemical, thermic, actinic, and a virus, a parasite or bacterial infection may be a potential cause of cancer. But in this field there is little or no evidence that any of these factors, except possibly heredity, plays an essential role. We are still absolutely unable to explain why it is much more prevalent in certain countries than in others; why it seems to be met with so less frequently among primitive peoples, as McGarrison and Hoffman have definitely shown.

We do not know its cause; we have no means of preventing it; our only hope lies in making a diagnosis sufficiently early to make successful treatment probable or possible. How can this be brought about? Obviously only by careful study of the symptoms presented and the utilization of all possible diagnostic measures for the judicial weighing of symptoms and the intelligent interpretation of signs as the only rod upon which we can lean, and yet not a frail rod if each of these is carried to the ultimate.

As regards early diagnosis, cancer of the esophagus stands easily first. Progressive difficulty in swallowing in the middle-aged or old, occasionally even intermittent dysphagia, should always make us suspect malignancy and the diagnosis is usually confirmed by a careful fluoroscopic and radiographic study, by esophagoscopy, possibly by biopsy. These cases can be diagnosed early; they metastasize late. They would be ideal cases for surgical attack if an effective technic had been devised, because in our experience radiation therapy has been almost universally disappointing, as, in fact, has been our experience with all forms of radiation therapy in the entire group of digestive neoplasms, with the possible exception of a few cases of colloid cancer, and surgery, radical surgery, not gastrostomy to relieve symptoms, should be our aim in esophageal cases.

As yet, the results of such surgery have been bitterly disappointing. The growth can be resected, but the anastomotic line due to great traction breaks down and infection, mediastinitis, pneumonia, death are the end results. On the other hand, I feel that with the marvelous development of thoracic surgery in the past decade we will develop a successful technic of resection of these growths; possibly the procedure which Dr. Reinhoff has suggested, first raising the stomach into the thorax by an artificial diaphragmatic hernia, later resecting the esophagus and anastomosing the stomach to the end of the esophagus with obviously the factor of traction minimized or eliminated; or perhaps by some other surgical procedure, which will come from study in this field.

In the case of the stomach, colon, sigmoid and rectum, there is no such cleancut picture to give us our clue. Pain, that God-given symptom, which brings the patient with peptic ulcer, gallbladder disease or appendicitis to the physician for an early diagnosis and prompt and appropriate treatment, is never present in the early stages of gastro-intestinal malignancy, and is often absent even in the very late stages. Anorexia, anemia, loss of weight and strength are not early, but late symptoms, and if we wait for them to develop we will of course make more correct diagnoses but the time for successful treatment will have long passed.

How then can we make an early or at least relatively early diagosis? A very early diagnosis is of course impossible because, especially in neoplasm of the stomach where the seat of election is the silent area, the lesser curvature, there must have been a long latent symptom-free period, often lasting for months and possibly even for one or two years, where diagnosis is absolutely impossible except by pure accident. What, in our pride, we often consider the first or second act is, in reality, the third or fourth act of the drama.

There is but one method, and one method alone, of reaching a relatively early diagnosis in these cases and that is by the realization of the fact that in the large majority there has been absolutely no digestive his-

tory whatsoever before. Digestive symptoms, however banal, however commonplace, which develop in people of middle or later life without obvious or apparent cause, should be considered potentially malignant, if the most careful examination eliminates disease elsewhere, infection, psychic and emotional factors, and they do not yield promptly to symptomatic treatment. The one peculiarity of these cases of malignant disease of stomach and large bowel is, that in the large majority there has been no previous history of digestive disturbance.

People speak of peptic ulcer and gastritis as predisposing factors in cancer of the stomach. In my experience they play an absolutely minimal role! A thorough analysis of all our material over a long period of years has shown that less than 5 per cent of our cases of gastric neoplasm have had a previous history that even suggests peptic ulcer; that somewhere between 5 and 10 per cent have had previous digestive symptoms which might be interpreted as functional dyspepsia or possibly mild gastritis, but that in more than 85 per cent of the cases there had been absolutely no history of previous gastric disturbance whatsoever.

The gastritis so frequently met with in cases of gastric carcinoma is, I feel sure, not the cause but the effect of the malignancy with its vascular changes and its inevitable secondary infection. As we said before, these early symptoms are utterly uncharacteristic; they are often so slight that the patient pays little or no attention to them and rarely calls in a physician; often so mild that even if a physician is called in he regards them as purely functional and treats them symptomatically without intensive examination. The symptoms in the stomach may be only fullness or distention after meals, a little eructation, and slight diminution of appetite, a slight epigastric discomfort, nothing more; in the large bowel, slowly progressing constipation or periodic attacks of constipation, attacks of distress, discomfort or even slight pain, practically always regarded as symptoms of mild colitis or of an intestinal neurosis. We have seen cases, for instance, of colonic neoplasm placidly treated for these supposedly commonplace and benign conditions, constipation, colitis, neurosis, where the correct diagnosis should and could have been made six, twelve or even eighteen months earlier if a suspicion of their true nature had arisen and if the proper diagnostic procedures had been utilized. But, and this is the crux of the situation, usually appearing in people whose past digestive history has been negligible, appearing without cause and not yielding to symptomatic therapy, the symptoms coming on insidiously, without warning, appearing like a thief in the night. And this suspicion of potential malignancy must be our most important single means of reaching an early diagnosis because only with this suspicion will we set in motion the series of investigations which generally lead us to a definite or probable diagnosis.

What are these diagnostic procedures? In the case of the stomach, the most careful physical examination of the abdomen, the study of the stool for occult blood, possibly serological tests, intensive fluoroscopic and radiographic studies from different angles, and last, but by no means least, the study of the interior of the stomach by the gastroscope, this latter procedure promising more than any other one method to give us the earliest diagnosis in suspected cases.

In the case of the large bowel, the study of the stool for occult blood, digital-rectal examination, very careful abdominal palpation under the hot bath, if the walls are rigid, proctoscopic and sigmoidoscopic study and careful x-ray examinations with barium given both by mouth and by rectum. Perhaps here the most valuable single method is the fluoroscopic study of the bowel after barium enema, watching the barium slowly flow in and the gut expand.

If by these means we are able to make a definite or a probable diagnosis of malignancy of the stomach, cecum, colon, sigmoid or rectum, what treatment can we advise? At the present writing it seems to us that there is but one answer. Surgical attack with extensive resection if this is possible, for, in the digestive field at least, other methods of treatment, radium, deep x-ray, colloid silenium and lead, and other even less promising procedures, have been singularly disappointing.

In the hands of the best operators, the mortality in extensive resection is not great, not more than 10 per cent in cases of the stomach, less than 10 per cent, possibly less than 6 per cent in the case of the large bowel, but these figures of course only in the hands of the best surgeons. Occasionally a growth will be inoperable, and surgery will have to be performed for obstruction, but in the main our object must be not palliative surgery, but bold resection in the hope of getting permanent cure.

There have been many interesting by-products of these studies. For instance, while as a rule

the smaller the growth, the greater its operability, there are some exceptions, and the size of the growth *per se* is no justification for refusing operation, if there are no signs of metastases elsewhere, notably in liver, regional lymph nodes or cul-de-sac of Douglas. Some of these cases over a very long period of time remain only local problems. Some, unfortunately, even very small growths, metastasize early, and here surgery is obviously only palliative, usually to relieve organic obstruction.

Again, in our experience, there are certain interesting differences between neoplasms of the right side of the large bowel and of the left. The former, cecum, ascending colon, are more cellular, grow more rapidly, ulcerate earlier, are more likely to have bleeding, sometimes excessive bleeding; while on the left side, descending colon and sigmoid, there is likely to be relatively far more connective tissue, the growths are smaller, grow more slowly, bleed far later, but obstruct much earlier.

What have been the results of these surgical attacks on digestive neoplasms? In the esophagus, still bitterly disappointing, but potentially this is a very successful field if and when a satisfactory surgical technic can be developed. In the case of the stomach, there are still of course many disappointments, but we have an ever-increasing number of cures of from two, five or even ten years or more of duration, a list of successes that must increase by our growing appreciation of the need of early diagnosis and the means of reaching such a diagnosis.

In the case of the large bowel, at present our most successful field, a large number of cases of complete cures lasting many years with a decreasing operative mortality is the story. Success is sometimes met with even in cases in which the disease has unquestionably been present for a year or even more. In all these cases the mortality should be materially decreased by the ever-improving methods of anesthesia, methods especially designed to lessen shock, minimize pulmonary complications and reduce the possibility of postoperative ileus to a minimum. Perhaps nothing is more promising in this connection than the new intra-abdominal splanchnic anesthesia extensively employed abroad and now beginning to be used in this country.

I think it is essential that in this field which is inherently discouraging, we should not hold a defeatist attitude; we should be willing to take great chances to get great results. We should feel that operation is justified in the absence of evidence of metastases even if the risks are great, but risk will be minimized if we can bring about operation at early and earlier stages of the development of the new growth, as I have tried to point out. I feel even that it is better to operate on a well-founded suspicion than to wait until a definite diagnosis can be made, but where it is too late for operative removal.

At the end of our journey I feel that we are justified in drawing the following conclusions:

(1) There is no characteristic symptom or even suggestive symptom in the early or relatively early stages of neoplasm of the stomach or large bowel. If one waits for a characteristic symptom, one will have waited far too long for effective treatment in most cases.

(2) There is, however, an invaluable and yet inexplicable finding in the majority of these cases; that is the complete absence of previous digestive symptoms.

(3) If one realizes this, in other words, if one suspects any digestive symptoms appearing with no demonstrable cause and not yielding to symptomatic treatment, and if one, based on this suspicion, utilizes all appropriate diagnostic procedures, a definite or at least a probable diagnosis can be made; in many cases antedating by months, sometimes by many months, what usually obtains in these cases.

(4) With this much earlier diagnosis based first on suspicion and secondly on utilization of proper diagnostic procedures, the percentage of cures by the only practical mode of attack, surgery, will be materially increased.

MODERN MANAGEMENT OF ACCESSIBLE MALIGNANT DISEASE*

By GRANT E. WARD, M.D., F.A.C.S.
Baltimore, Maryland

Since 1900, vital statistics in various large centers of population and in all registration districts throughout the United States have shown a steady rise in cancer mortality, until, at present, cancer is second only to cardiovascular diseases as the cause of death. (Some statistics place pneumonia second and cancer third.) The question naturally arises: "Why the increase in

*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

cancer deaths and is it real or apparent?" Several facts come to the fore in the study of this question.

In the last fifty years, advances in scientific medicine have changed the order of death-dealing diseases. A half century ago, communicable diseases, plague, smallpox, diphtheria, typhoid, infant dysentery, malaria, yellow fever, tuberculosis, and so on, were the great scourges of the civilized world. One by one these monsters have been conquered. "The White Plague," which at one time led among the causes of death, is now far down the list (sixth place). Most of these infectious diseases took their toll of death from infants, children and young adults, so that the average age of our population, forty or fifty years ago, was about 35. As infectious diseases were controlled, the average age of man has gradually increased, until, today, it is fifty years or more. This means that people living through the average age of fifty will die of diseases occurring in the latter years of life. One of the chief of these is cancer. Cancer is recognized as a disease of middle and late life, although we are continually seeing it in the young. Cardiovascular diseases and nephritis are also diseases of later life and are now prominent as causes of death as compared to a few decades ago.

According to the statistics of the New York Health Department, there is not an actual increase in the percentage of death caused by cancer in various age groups (Bull. N. Y. Health Dept., Vol. II, No. 6, 1934.) This report charts the cancer deaths for the various decades of life, 10 to 80 years, inclusive. Although many more people live to the upper decades of life (above 40) than formerly, the percentage of deaths from cancer in the upper brackets is no larger than it was in 1900.

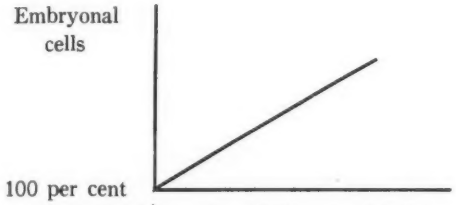
Other factors bearing on the increase in cancer deaths throughout the country are more accurate, vital statistics, correct diagnosis by x-ray, and pathological studies and more diagnoses by operation.

Interpret these data as you will, nevertheless cancer is second in the cause of death throughout the country. Such a situation brings two striking facts to mind. First, that so far no universal cure has been found for cancer; and, second, that we as physicians must use every means at our disposal to treat successfully as many cases of cancer as is possible. A discussion of a possible universal cure for cancer is not within the scope of this paper. It is, however, pertinent to outline for you the modern methods of combating accessible malignant disease. Accessible malignant disease I will define as neoplasms of the skin, oral cavity, accessory nasal sinuses, breast and female genitals. Practically all of these lesions give some external manifestation of disease early and often premalignant conditions can be recognized and eradicated before cancer really develops.

No single therapeutic measure is applicable to all of these forms of cancer. There are several potent agents at our disposal, which, when properly selected, and applied, will yield a surprising number of good results in the early cases and be of much benefit in palliating the advanced. The choice of the agent or agents for any given case will depend, of course, upon the histological structure of the growth, its stage of progress and its situation. He who would attempt to care for accessible malignant disease, must first have available facilities for proper study of the patient, including blood examinations, x-rays and histological investigations of the tumor; second, he must have cognizance of the indications for choice of the proper therapeutic agent or agents and their beneficial effects and dangers. He must know when to use surgery or irradiation (radium or x-ray) and when these agents have accomplished their mission; he must know when to use electrosurgery or when it is to be combined with other treatments. It is not necessary that he be able to apply all of these himself, but he should understand them sufficiently to have them given at the proper time. It is usually best for two or more experts in their various fields, surgeon and radiologist, to cooperate in the fullest harmony for the well-being of the patient.

Sensitivity of Neoplasms to Irradiation.—As a general rule, tumors vary in their reaction to irradiation therapy according to their cell differentiation. Living cells have two functions, that of reproduction and that of adult cell activity: protection (skin), secretion (glands), locomotion (muscles and bone), cementing tissues together (connective tissue) and organization and transmission of conscious or unconscious impulses (nerve tissue). Cancers possess a large amount of the first, or embryonic function (rapid growth), and a varying amount of the second, depending upon their differentiation. If one should plot a curve of irradiation sensitivity, using the ordinates as cell differentiation with 100 per cent at the bottom and the abscis-

sae as irradiation reaction the curve would rise to the right.



For example: the most sensitive skin malignancy is basal-cell epithelioma, which is made up entirely of embryonal cells. The opposite of this would be highly differentiated squamous-cell carcinoma, having many pearly bodies and much keratin in the other cells. Adenocarcinoma follows the same rule. Those having very little adenomatous formation, the cells wandering in poorly formed strands through the stroma, are very sensitive to irradiation, while others, in which well-developed glands are present, many times actively secreting (colloid carcinoma), are very resistant to irradiation. Connective tissue tumors behave similarly, cellular sarcomas being more sensitive than fibrosarcomas.

It should be said also that often the more embryonal tumors metastasize more rapidly and widely than the differentiated ones, so that often the prognosis is more grave.

Biopsy.—Much has been written about biopsy for the last fifteen or twenty-five years. If at all possible, a biopsy should be made of every tumor before it is treated, unless it be some very small basal-cell epithelioma or pigmented mole, in which the diagnosis is quite clear without microscopic examination, and which can be eradicated by excision. Many small lesions of the lip and tongue or skin can be totally removed with a wide margin and biopsy be made to determine whether postoperative irradiation is indicated.

A convenient method of taking biopsies of ulcerated lesions is to use a small, specially prepared, rather long-handled rongeur, as devised by C. F. Burnam, which clips out a bit of tissue about 0.5 cm. in diameter. This is not dangerous and is of exceedingly great value in making the proper diagnosis. Some have suggested that such biopsies are dangerous, but certainly the benefit obtained by a proper diagnosis overshadows any suspicion of danger.

Blood Studies.—Blood for Wassermann should always be taken as syphilis and cancer frequently occur simultaneously, especially in the mouth. Blood counts should be made before and after long, deep x-ray series to guard against leukopenias and anemias. Should the leukocyte count drop below 3,000, treatment is suspended until the count improves.

Skin.—Many skin blemishes are precancerous and if removed early further trouble will be obviated. Moles of various sorts, pigmented birthmarks and fibroma molluscum are subject to irritation and should be removed with wide surgical excision, or preferably with electrosurgery. They are resistant to irradiation. On the other hand, warts, hyperkeratoses and basal-cell epitheliomata yield readily to radium, x-ray or electrosurgery. Squamous-cell carcinomata are less sensitive to irradiation, although some small ones yield to massive doses of radium or x-ray and other larger ones require the addition of electrosurgery after having irradiation. The choice of treatment, amount of irradiation, or combination of electrosurgery with irradiation, depends on histological picture and reaction of the tumor itself.

Many of the large, squamous-cell carcinomas of the back of the hand, lower part of the face and neck, require heavy radium or x-ray treatment and then electrosurgical removal. Oft times, secondary skin grafts are required. The epitrochlear and axillary lymph nodes should receive deep x-ray therapy if the growth is long-standing or extensive. Peculiarly enough, these malignancies do not metastasize early.

Lip.—Cancer of the lip is usually of the squamous-cell variety and rather highly differentiated. Due to the large amount of tissue in the lip, any one of four methods of treatment usually suffices to eradicate the primary lesion. These are: radium, x-ray, electrosurgery or surgery. The important factor is thoroughness and not method when treating cancer of the lip. Scalpel excision with a wide margin, sometimes requiring the shifting of skin-flaps, often suffices to eradicate the smaller growths. Usually those which are large, involving one-half or one-third of, or all of the lip, are preferably treated by irradiation, as there is a better cosmetic and functional result. With scalpel excision, I usually prefer to take a rectangular block and shift flaps from each side in preference to the usual

V-incision. The latter often brings the field of operation rather close to the growth, deep in the lip. Some authors take out a quadrilateral piece of tissue with the base larger than the top, so that the lymphatics are included as they spread away from the growth.

Oral Cavity.—In the oral cavity several problems confront us. First, most of the malignancies are of the squamous-cell variety and, therefore, are fairly resistant to irradiation. Second, the oral cavity is always infected, rendering the tissues less resistant to the invasion of the cancer. Third, the growth is usually situated in an inaccessible place for surgery, along the jaw, floor of the mouth or far back on the tongue or tonsil. In practically every case of malignancy of the oral cavity, a combination of therapeutic agents should be used.

In the Oncological Clinic of the University of Maryland, in connection with the Oral Surgical Department of the University of Maryland Dental School, under Robert P. Bay, we have adopted a routine for the treatment of malignancy of the oral cavity. After proper diagnosis, a thorough course of deep x-ray, through each side of the neck, including a sufficient amount of the oral cavity to cross-fire on the growth itself, is the initial treatment. The following is the technic used by Henry Walton, roentgenologist of the University of Maryland:

200 kv., 20 milliamperes, 50 cm. distance, Thoreaus filter, or the equivalent of 2 mm. of copper. Variable sized portals. Two portals, lateral and submental. 200 R. per day to one portal. Total dose, 2,000-4,000 R. to each portal.

This takes from two to three weeks, during which time the growth becomes paler and smaller and the usual coincidental marked infection clears up decidedly. A mucositis, as represented by a diphtheritic membrane, appears over the mucosa.

After a period of six or eight weeks more, depending upon the regression of the lesion, radium is used to eradicate any lingering areas of growth and the dose calculated as necessary. Radium should be given either with radon seeds or radium element needles, in the case of much induration, or by direct application to the surface in the case of more superficial ones. For this purpose, a dental compound mould is made and held in place by two brass rods held together by a universal joint and applied to a leather strap about the head. In another month or two, if the growth is not entirely gone, the remaining portion is removed with a wide margin, using electrosurgery. Painful, sloughing scars and involved bone are likewise cleaned out. Electrosurgery is helpful in relieving the pain of radium periostitis when the growth is near the jaw-bone. By coagulating the injured periosteum, pain is markedly relieved.

Lymph Nodes of the Neck.—The problem of metastatic lymph nodes is considered for cancer of the lip or oral cavity alike. In examining all patients, bimanual palpation of the floor of the mouth and neck should be made. With the gloved left forefinger under the tongue, the fingers of the right hand can more readily palpate any early lymph node, a great adjuvant in prognosis and treatment. In our clinic, we have not adopted a method of routine excision of the nodes of the neck as has been advocated elsewhere. We do, however, give deep x-ray treatment through the neck as a routine, even though lymph nodes are not palpable. This practice is based on the assumption that if x-ray can affect large, palpable nodes, how much more can it affect microscopic bits of cancer tissue in nodes that are not palpable!

After lymph node metastases have developed and if they are not adherent, or over 1.5 to 2 cm. in diameter, the same type of x-ray treatment is given, followed in six or eight weeks by electrosurgical resection of the lymph node-bearing areas of the neck. Large, massive nodes are often implanted with radium-element needles, or radon seeds, six or eight weeks following the heavy course of x-ray.

Cancer of the Nasal Accessory Sinuses.—Cancer of the antrum of Highmore is not uncommon and we occasionally see cancer of the ethmoid or sphenoid sinuses and rarely in the nose itself. I have under my observation a patient who had a rather highly differentiated squamous-cell carcinoma, which began in the nose. Now he is clinically free of disease, but having considerable pain from periostitis, probably caused by the irradiation and infection.

Due to the inaccessibility of these tumors, some surgical approach is necessary adequately to apply the irradiation. These cases are, as was described under "oral cavity," given a long

course of deep x-ray therapy. Walton's technic is as follows:

Larynx.—200 kv., 20 milliamperes, 50 cm. distance, Thoreaus filter, or the equivalent of 2 mm. of copper. Variable size portal, 2 fields, right and left lateral neck. 200 R. per day to one portal. Total dose, 2,000 to 4,000 R. to each portal, depending upon the nature, size and extent of the tumor, and the condition of the patient.

Sinuses.—200 kv., 20 milliamperes, 50 cm. distance. Thoreaus filter, or the equivalent of 2 mm. of copper. Variable sized portal, 2 portals anterior and lateral; 200 R. per day to one portal. Total dose, 1,600-2,500 R. to each portal.

Then, six or eight weeks later, they are attacked by a surgical method. Cancer of the antrum is best reached by a Ferguson's incision, laying back the cheek. This incision passes up through the upper lip, along the border of the nose, to about one-half inch below the inner canthus of the eye; then, laterally along the edge of the orbit, out over the zygoma. So frequently, the zygomatic process of the malar bone is involved by growth, that it is important to expose and remove this bony structure. There is no difficulty in approaching extensive growths as the bone is usually eroded. All growth is then thoroughly cleaned out by electrosurgery and all points where it may be adherent or has invaded beyond removal are thoroughly destroyed with a coagulating current. Radium, filtered with 1 mm. of platinum and aluminum foil and placed in rubber cots, is now applied to all of the areas where the growth could not be completely removed. The cheek is then sutured back in place. Occasionally, the heavy radiation causes delay in the healing of the horizontal incision under the eye, but this can be repaired later by a plastic procedure.

When the growth in the antrum appears in the x-ray to involve the floor or medial wall, it may be approached through the mouth. Usually, however, this does not give adequate enough exposure to remove all of the tumor completely with electrosurgery and adequately to apply the radium. By this combined method of treatment, we have been able to control many of these difficult cases and maintain life for several years, in one patient for six years. The usual radium dose in cancer of the antrum is from 1,000-3,000 mg. hours.

Carcinoma of the Breast.—The fact that women are constantly dying of breast cancer indicates that surgery at its best has not conquered the problem. In recent years, public education, to the end that patients should come early, has not added a great deal to the percentage of five-year cures. Some clinics obtain as high as 50 per cent five-year cures in cancer of the breast with no involved lymph nodes at the time of operation. So many patients come with involved nodes, however, that the percentage drops to 10 or 15. This means that some new method of treatment is necessary. In our clinic we have followed the lead of the Memorial Hospital in New York, and Drs. Christie, Groover and Merritt in Washington, in giving preoperative irradiation.

Carcinoma of the breast is an old and frequent offender. As with any other malignancy, early diagnosis is imperative. A single, hard, painless lump is always suspicious. Other signs, as fixation to the breast tissue, retraction of the nipple, pig-skin appearance of the overlying integument and palpable, axillary lymph nodes, are usually later signs. In the Pathological Department of the University of Maryland, aspiration biopsy has been utilized by Robert E. Wright, but we have not had the success of the Memorial Hospital in New York.

It is our policy, however, to treat any suspicious lump as malignant and to have the x-ray department give a thorough course of roentgen therapy through the breast, axilla and supraclavicular region as follows:

200 kv., 20 milliamperes, 50 cm. S.F.D. Thoreau's filter or the equivalent of 2 mm. of copper. Variable sized portals, 3 portals, anterior, supraclavicular and axillary. 200 R. per day to each portal. Total dose, 1,600-2,000 R. to anterior and supraclavicular; 800-1,000 R. to axillary.

Many small lumps almost disappear and many large ones greatly reduce in size. Sometimes inoperable tumors become operable.

The radiation itself takes about three weeks. Radical breast operation is carried out from six to eight weeks later. Some authorities rely on a simple breast amputation after irradiation, but we feel that the patient should be given every benefit of the doubt and a radical operation performed. No x-ray is given postoperatively, unless recurrences develop and they are treated accordingly.

For many years it has been known that in women cancer of the breast is very slow growing after the menopause. Many years ago, operative removal of the ovaries was carried out to

make the advanced cases, particularly with bone involvement, more comfortable. With the advent of irradiation therapy, sterilization is so much easier that we carry it out in a large number of our breast cancers, particularly where the disease is advanced or bone is involved.

Cancer of the Female Genitals.—As a matter of expediency in the Oncological Department of the University of Maryland, the work is divided into two parts: general oncology and female oncology. The latter is in charge of J. Mason Hundley, Jr., Professor of Gynecology. Inasmuch, however, as cancer of the female organs is more or less an accessible one, because of outward manifestations, I feel that it should be included in this discussion.

Cancer of the vulva and urethra is not common. Because of the large amount of soft tissue, surgical excision is ofttimes sufficient to remove small cancers of the vulva, but not so easily of the urethra. Here irradiation offers the much better result. For vulvar cancer, our technic has been first to irradiate the growth by applying a radium pack and giving from 1,000-2,000 milligram hours per square inch, filtered with 1 mm. platinum and aluminum foil.

This irradiation is followed by electrosurgical excision, allowing the wound to granulate under dressings moistened with picric acid solution. In about four weeks a course of deep x-ray is given through the pelvis. This technic has given very good results in our hands.

Cancer of the cervix is a very prevalent malignancy. Since the opening of our clinic in 1931, Hundley has treated, to date, 222 cancers of the cervix. In general, he has followed the technic of Heymann, of Stockholm, and has had results which compare favorably with his. Their percentage of patients well at the present time is 50 of the total group, in which many were very extensive on admission.

The routine treatment is as follows: The white blood count should be 3,000 or over before beginning treatment. A course of deep therapy x-ray is given as the initial treatment to clear up infection and shrink the growth. This extends over a period of three to four weeks, during which time 6,000-7,000 R units are given through the pelvis at various angles. After a period of three or four more weeks, a white blood count is again taken and if it is 3,000 or more, radium is applied. The radium is applied intracervically and contracervically, 30 per cent being placed within the uterus and filtered with 1 millimeter of platinum, aluminum foil and rubber. Seventy per cent of the dose is placed against the cervix and in a heavier filter of 2 millimeters of platinum, aluminum foil and rubber. At the time that this is given the patient is cystoscoped to determine whether there is any bladder involvement prior to the application of the radium. It is interesting to note that several patients have shown bullous edema or actual involvement of the bladder wall before any treatment was applied. This, no doubt, accounts for the fistulas which occur later, and are from the growth and not from the treatment. Two such radium applications of 3,000 milligram hours each are given about three weeks apart.

Carcinoma of the body of the uterus offers a different problem. Diagnostic dilatation and curettage is, of course, done first. If frozen section shows carcinoma, immediately an intrauterine treatment is given with radium tubes filtered with 1 mm. of platinum, aluminum foil and rubber, the dose being 4,000 milligram hours. Three weeks later, pan-hysterectomy is done. A month after the operation, deep x-ray is given, similar to that for carcinoma of the cervix. If biopsy shows a rather benign type of carcinoma of the body, no radium is given, but a hysterectomy is immediately performed, followed in a month by a course of deep therapy x-ray.

SUMMARY

To summarize, then, this paper has outlined modern methods of treatment of accessible malignant diseases, chiefly as practiced in the Oncological Clinic of the University of Maryland, under the joint direction of J. Mason Hundley, Jr., and the author. No one therapeutic agent is the panacea for cancer. Each case is a problem unto itself and one must be guided by experience in the use or observation of the use of irradiation therapy (x-ray and radium), surgery and electrosurgery. Some cases yield well to one of these agents, others require two or all four. Therefore, he who would treat malignant disease must first study the condition and select the therapeutic measure, or measures, fit for the case at hand.

THE CURVE OF PHENOLSULPHONPHTHALEIN ELIMINATION IN UNILATERAL KIDNEY DISEASE*

By E. Clay Shaw, M.D.
and
Jack A. McKenzie, M.D.
Miami, Florida

On going over the records of kidney function tests done at the Brady Urological Clinic of the Johns Hopkins Hospital about twelve years ago, it was found that the 'phthalein test as performed by the estimation of the dye eliminated in the one and two-hour urine specimens was failing in many instances to give an accurate picture of renal efficiency. Not only were there cases with nitrogen retention in the blood that had a fairly normal 'phthalein elimination within the two-hour period, but in many instances the obvious clinical improvement that occurred in prostatic obstruction during catheter drainage was not registered by the 'phthalein test. This lack of confidence had extended to the internists, who were seeing cases of various types of nephritis that continued to give a normal two-hour 'phthalein elimination even when the disease had reached an advanced stage. It was at this time that Dr. Hugh H. Young assigned to one of us the problem of making a clinical study of 'phthalein elimination in association with other function tests in various types and stages of kidney disease, and if possible to modify the technic so as to reflect more adequately the changes in renal efficiency.

The mode of approach was first to determine the curve of elimination of 'phthalein in normal individuals by collecting the urine at frequent intervals and to use these curves as a standard with which to compare the curves obtained under similar conditions from patients with diseased kidneys. It was found that the curve of elimination of the dye was of far greater importance than the quantitative output. In other words, the inter-relationship of the percentages of dye obtained in a series of fifteen-minute collections meant far more than the total percentage of the dye eliminated within two hours. In the course of this investigation practically all types of kidney disease were studied, and in every instance in which an impairment of kidney function could be demonstrated by any other test, there was an abnormal curve of 'phthalein elimination, and in some instances impending renal failure was correctly predicted by an abnormal 'phthalein curve, while the other function tests at our disposal failed to predict such an event. It was also found that the 'phthalein curve quickly recorded changes in renal efficiency. We concluded from this study that the curve of 'phthalein elimination was the most sensitive test of renal efficiency and should be differentiated from the original test as performed by determining the total output in a one or two-hour specimen. Our observations and conclusions have been amply confirmed by subsequent writers, and the literature now contains reports of the test being performed by both methods with resulting uncertainty as to exactly what is meant by the term "'phthalein test." To avoid confusion we suggest that the comparison of fractionally collected specimens be termed "the 'phthalein elimination curve" rather than the "'phthalein test."

In the course of our earlier investigation the differential curves of 'phthalein elimination were determined in several cases of unilateral kidney disease, but were not discussed in our original report as they promised to lead us too far astray from our assigned task. It is the purpose of this report to present some observations on the curve of 'phthalein elimination by each kidney in cases of unilateral kidney disease, and in the light of the dye concentration in the blood stream, to attempt an interpretation of the diverse results. While the number of cases studied are not sufficient to justify dogmatic conclusions, it appears that a consideration of these curves may shed some light on the mechanism of the functional changes occurring in hydronephrosis and pyelonephritis. Since these differential curves can be better interpreted with an understanding of the manner that 'phthalein is eliminated by a normal individual and by cases with bilateral kidney disease, a portion of our original report will be briefly reviewed. A knowledge of the variation of the dye concentration in the blood stream was also found to be essential and will be given for each group studied.

Methods.—The dye in all cases was administered intravenously. The usual test dosage of 6 mg. was used in most instances; in those re-

*Read in Section on Urology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Florida Medical Research Foundation.

ceiving larger dosage the amount is indicated. The quantity of 'phthalein in both the urine specimens and blood stream is expressed in terms of the percentage of dye administered. The determination of the concentration of 'phthalein in the blood stream by colorimetric readings offered some difficulty due to the variations in coloring matter in the plasma of different subjects. This difficulty was met by preparing standards from the subject's own plasma before the test was begun. The standards were prepared by adding known quantities of 'phthalein to freshly collected oxalated blood and withdrawing the plasma after high speed centrifugalization. Blood to be tested was collected from the opposite arm at various intervals after the intravenous injection of 'phthalein, oxalate added, and the plasma obtained as in the standards. A drop of alkali was added to all tubes just before the readings were made. Careful handling of the specimens was necessary to prevent hemolysis. The results are expressed in percentage of the injected dye in the entire circulating blood by making allowance for the estimated blood volume of the subject.

'PHTHALEIN ELIMINATION IN THE NORMAL

It was found that following the intravenous administration of 6 mg. of phenolsulphonphthalein, 8 to 15 per cent of the drug could be recovered from the urine five minutes from the time of administration, and that the peak of elimination invariably occurred during the second five-minute period. In every case over half the amount of the drug that would be eliminated in two hours was put out during the first fifteen minutes. From this observation it was reasoned that the collection of the urine at in-

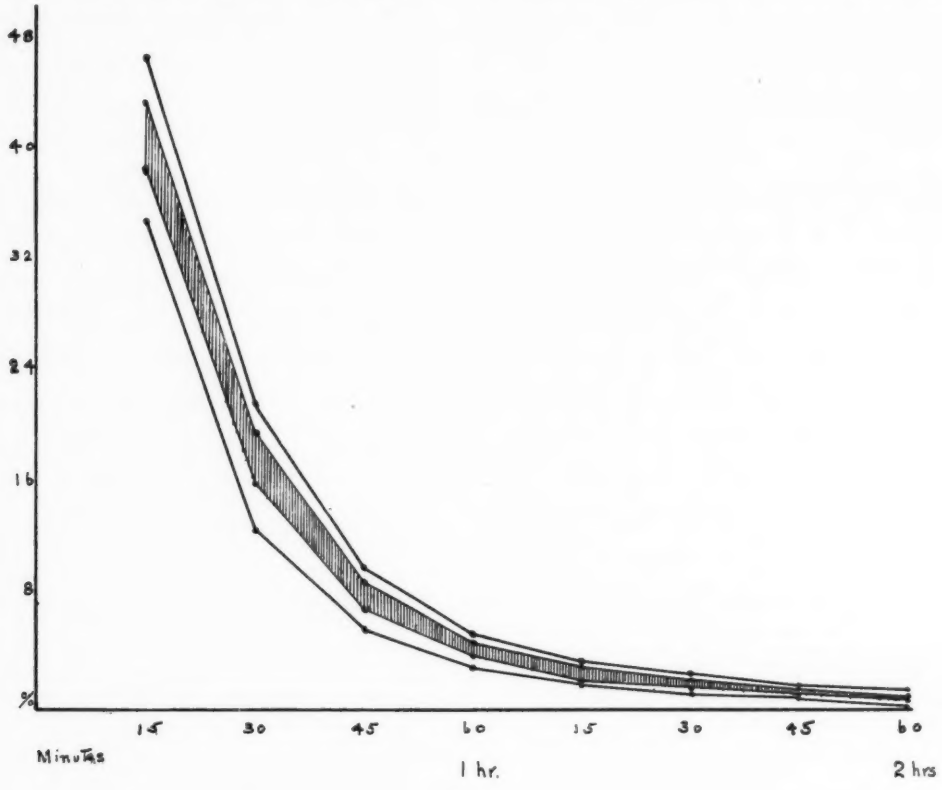


Fig. 1
The variations of the normal fifteen-minute interval curve of 'phthalein elimination as determined by forty-four tests on twenty-three normal individuals. Thirty-three of the forty-four curves fell within the shaded zone.

tervals of fifteen minutes would be the proper as well as a practical basis for the estimation of the curve of elimination. To determine the variation of normal, forty-four tests were made on twenty-three presumably normal individuals. The results are shown in *Fig. 1.* Thirty-three of the forty-four curves fell within the shaded area. The limits of the other eleven were within the lines drawn above and below the shaded area. A striking feature was the small amount of variation that occurred in the curve of elimination of an individual when repeated tests were made. The total output in the same subject in these tests did not vary more than 8 per cent. *Table 1* shows the average and the variations of percentage eliminated at fifteen-minute intervals in this series.

To determine the kidney's reaction to an increased quantity of dye, a series of five normal subjects who had been tested with 6 mg. of 'phthalein were given 30 mg. of the drug and the elimination curve determined as before.

Table 1

AVERAGE, HIGHEST AND LOWEST PERCENTAGE OF 'PHTHALEIN ELIMINATED IN FIFTEEN MINUTE PERIODS IN A SERIES OF 44 TESTS ON 23 NORMAL CASES

	Fifteen Minute Periods							
	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth
	%	%	%	%	%	%	%	%
Highest	47	22	10	5.5	3.5	2.5	1.8	1.2
Lowest	35	13	5.8	3	1.8	1	0.8	trace
Average	40	17	8	4.5	2.5	1.8	1	0.5

The percentage of the administered dye was slightly less in each specimen, but the curves were unchanged. Blood was drawn from the opposite arm of these normal subjects at frequent intervals while the tests were in progress and the percentage of dye in the specimens determined by the method described above. In

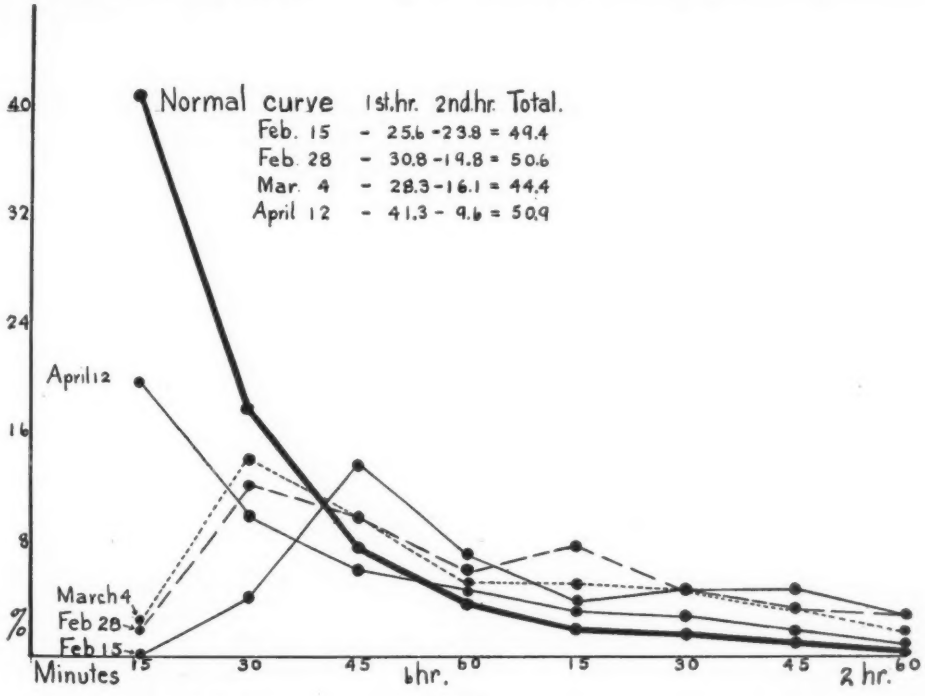


Fig. 2

Repeated curves of 'phthalein elimination in a case of renal damage from back pressure and infection following prostatic obstruction. The tests were made at intervals during the period of retention catheter drainage. The normal curve is shown for comparison.

all instances the highest concentration of the dye in the circulating blood occurred two minutes after the injection. After making proper allowance for the blood volume of the subject, an average of 55 per cent of the administered dye was found in the circulating blood two minutes after injection; this dropped to 37 per cent in five minutes, to 13 per cent in fifteen minutes, and to zero, or a mere trace, at the expiration of thirty minutes. These results indicate that almost two-thirds of the administered dye has been fixed in the tissue or at least removed from the circulation five minutes after it had been injected.

'PHTHALEIN ELIMINATION IN BILATERAL KIDNEY DISEASE

In our earlier report we showed that mild renal insufficiency was characterized by a curve of 'phthalein elimination in which the early fifteen-minute collections were below the normal curve and the later fifteen-minute eliminations were above. As renal impairment increased, the peak of 'phthalein elimination shifted from the first fifteen-minute period to the second fifteen-minute period, and in uremic cases quite often occurred in the third fifteen-minute collection. Several cases of severe renal damage were given 30 mg. of 'phthalein and the dye concentration in the blood and the curve of elimination in the urine determined simultaneously. It was found that the percentage of dye remaining in the circulation was higher than the normal for the first fifteen minutes, but that nearly all had disappeared at the end of thirty minutes. *Fig. 5* shows a typical case. Here the peak of elimination was reached in the third fifteen-minute period, while only a trace of dye remained in the blood after thirty minutes. This phenomenon can be explained only by assuming that severely impaired kidneys in some instances have difficulty in eliminating 'phthalein that they take up from the circulation.

'PHTHALEIN ELIMINATION IN UNILATERAL KIDNEY DISEASE

Urine collections in these cases were made through large whistle-tipped catheters intro-

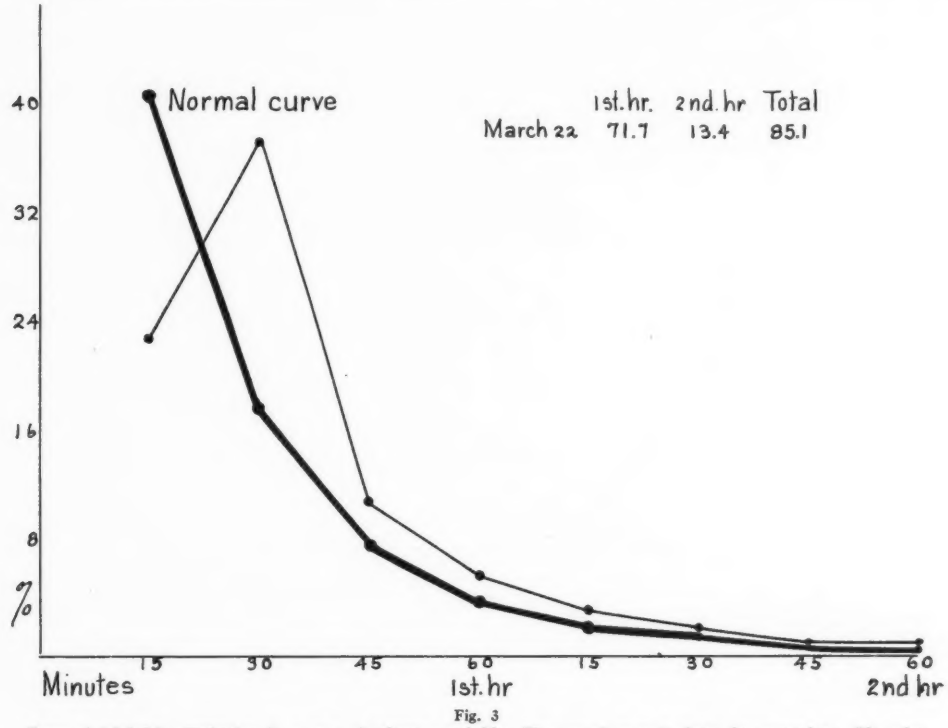


Fig. 3

Curve of 'phthalein elimination in a case of subacute nephritis. The normal curve is shown for comparison. The other renal function tests in this case were negative.

duced into each kidney after forcing fluids to a point that would insure a constant drip. Collections were made at fifteen-minute intervals, the pelves being washed out with normal saline solution at each collection. After collecting four fifteen-minute specimens, a urethral catheter was inserted into the bladder before the ureteral catheters were removed. All cases in which leakage had occurred around the catheters, as indicated by the presence of dye in the bladder, were discarded. The concentration of 'phthalein in the blood was determined at fifteen-minute intervals in some of these cases.

There was no increase over the normal of the dye concentration in the blood in any of the cases with one normal kidney, regardless of the status of the diseased kidney; this was true even when doses as large as 30 mg. were administered. In other words, in individuals with unilateral kidney disease there was less than 15 per cent of the administered dye in the blood stream at the end of fifteen minutes, and this dropped to zero, or a mere trace, within thirty minutes.

The normal kidney working with its diseased fellow rarely put out more dye than the calculated half of a normal secretion. In most instances the curve ran very close to one determined by halving each reading of the total function of an average individual. Complete examination of the few cases that did show compensation with a higher curve revealed either an atrophy or a tremendous destruction of the tissue of the opposite kidney.

The diseased kidneys formed curves that appeared to be varying combinations of two fairly definite types: one group (*Fig. 6*), which included atrophic kidneys and most of the large uninfected hydronephroses, showed a marked diminution in quantity of dye eliminated in all of the fifteen-minute specimens, but each specimen was less than the one preceding it, so that often the curve ran parallel to the normal, but at a lower level. The other group (*Fig. 7*), which included most of the infections, began with a low elimination during the first fifteen-minute period, gradually to rise and cross the

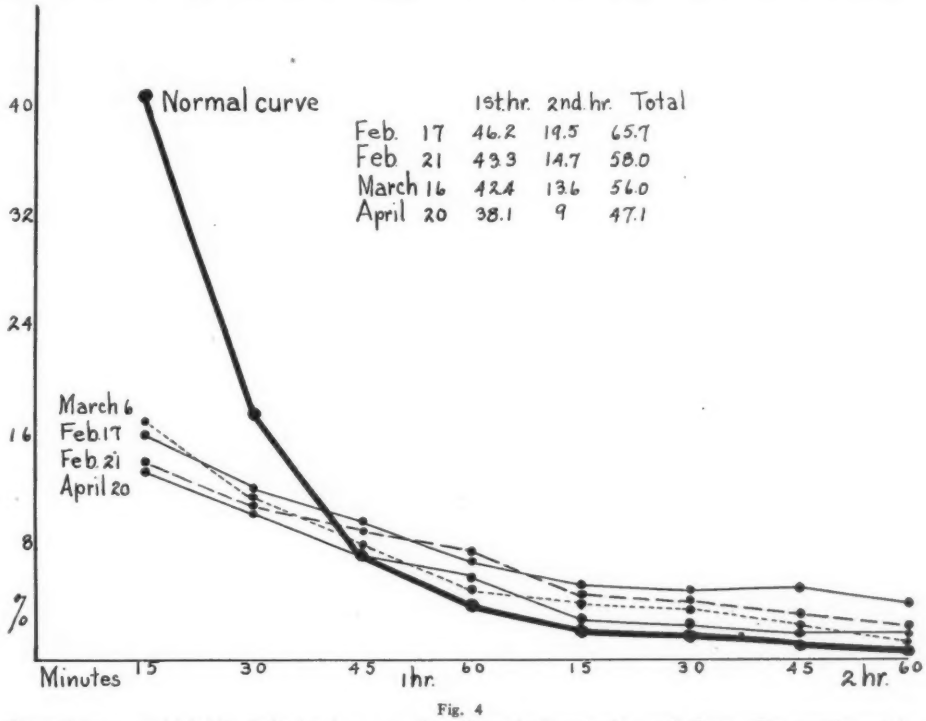


Fig. 4

Repeated curves of 'phthalein elimination in a case of cardiovascular hypertensive renal disease. The normal curve is shown for comparison.

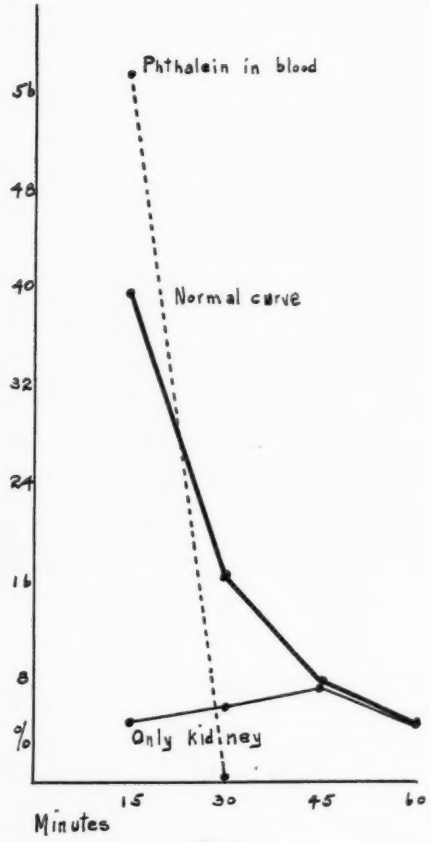


Fig. 5

Curve of 'phthalein elimination of a solitary pyonephrotic kidney with curve of dye disappearance from blood stream. Note that peak of elimination occurred well after all the dye had disappeared from the circulating blood. The normal curve is shown for comparison.

curve of its normal fellow, and to reach its peak of elimination during the second or third periods. When it is recalled that the blood stream is clear of dye within thirty minutes and the diseased kidney at this time has not reached its peak of elimination, it appears obvious that such a kidney can still remove 'phthalein from the circulation, but has difficulty in eliminating it.

Since Marshall and Vickers have demonstrated in the dog that 'phthalein under certain conditions may be stored in the cells of the tubules and that it is eliminated by a true secretory process, it would seem advisable in interpreting our output curves to divide the mechanism of 'phthalein elimination into two phases: the first is the absorption of the dye from the circulating blood by the tubular cells, and the second is the secretion of the dye by these cells into the urine. It follows that a disease process which either destroys tubules or reduces the quantity of dye containing blood that reaches them, will result in a diminished total of dye elimination by such a kidney, regardless of the ease with which the tubules may secrete the dye which it contains. On the other hand, it is possible that certain disease processes may so alter

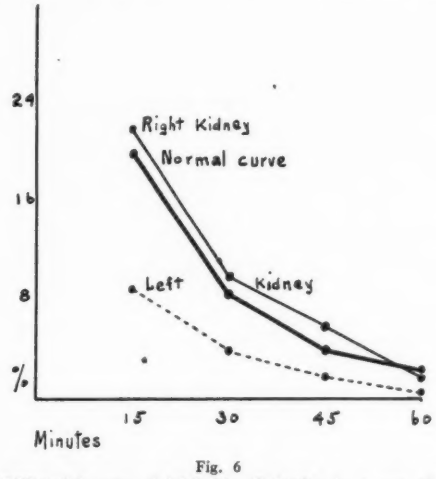


Fig. 6

Differential curve of 'phthalein elimination in a case of unilateral kidney disease. Right kidney was normal. Left kidney was greatly hydronephrotic but uninfected.

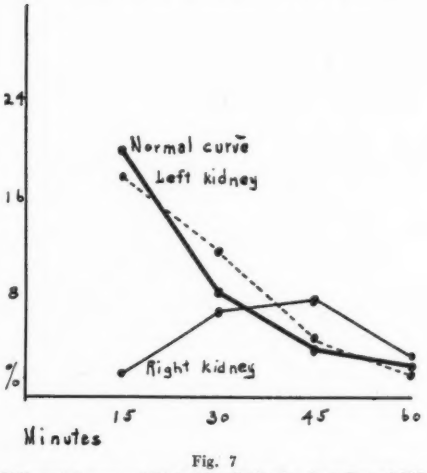


Fig. 7

Differential curve of 'phthalein elimination in unilateral kidney disease. Left kidney was normal. Right kidney was pyonephrotic.

the tubular cells that though they still may absorb the dye from the circulation, yet have difficulty in secreting it. Should the pathologic process affect only the first phase, we may expect a diminished output of dye with a normal inter-relationship of the fifteen-minute specimens. Should the second phase only be affected, there would be a normal total output but a delayed elimination and an abnormal inter-relationship of the fifteen-minute specimens. But should the pathologic process affect both phases, there will be both an abnormal output and an abnormal inter-relationship of the quantities of dye in the fifteen-minute collections. With this in mind, the careful study of the 'phthalein elimination curve of a deranged kidney will not only give us a measure of the degree of its impairment, but may also provide some insight as to the type and location of the injury.

On analyzing the 'phthalein elimination curves of the diseased kidneys in unilateral renal disease, it was found that inflammatory processes in general delayed the dye secretion, while impairment of circulation and tissue destruction reduced the total output. Most of the curves showed both delayed elimination and reduced output, which was interpreted to mean combinations of inflammation, impaired circulation, and tissue destruction. Working on this hypothesis, a study of the elimination curve in some instances gave an idea of the relative importance of these factors and was of prognostic value. A kidney with a delayed elimination but with a fair total output is usually capable of considerable improvement under treatment and the usual method of collecting a single twenty or thirty-minute specimen, and comparing its dye content with that of the other kidney, does not give a fair picture of the recovery potentiality of such a kidney.

CONCLUSIONS

The curve of phenolsulphonphthalein elimination, with its graphic demonstration of the interrelationship of percentage of dye eliminated in a series of fifteen periods is the most sensitive of all practical renal function tests. To avoid confusion, this comparison of fractional collections should be termed "the 'phthalein elimination curve" rather than "the 'phthalein test," since the latter term from long usage brings to mind the total dye excreted in a one or two-hour period. The curve in the normal is characterized by an elimination of 'phthalein in the first fifteen-minute period approximately equal to the total of the percentages eliminated in the remaining seven periods, and the dye in each specimen after the first is approximately half of that in the preceding period. The earliest departure from normal renal efficiency is indicated by a decrease in dye elimination in the first fifteen-minute specimen with a corresponding increase in the later specimens. As renal failure advances, the peak of elimination shifts from the first to the second period, and in severe failure to the third period.

In unilateral kidney disease, the damaged organs in some instances eliminate a reduced portion of 'phthalein in a normal manner, while others with a higher total output show a delayed elimination with the peak occurring after all dye has disappeared from the blood stream. Analysis of the curves after correlating the clinical pictures indicates that inflammatory processes delay elimination of the dye, while impaired circulation and tissue destruction reduce total output. The majority of cases studied showed various combinations of reduced output and delayed elimination and were interpreted to be the result of renal lesions combining inflammation, impaired circulation and tissue destruction in varying degrees. Bearing in mind that the cells of the tubules have the function of storing as well as secreting 'phthalein, and that different types of pathologic processes appear to affect these functions differently, a study of the 'phthalein elimination curve not only gives an index of a kidney's efficiency, but may also yield information as to the type and localization of the pathologic process that is of diagnostic and prognostic value.

REFERENCES

1. Rowntree, L. G.; and Geraghty, J. T.: Jour. Pharmacol. & Exper. Ther., **1**:579, 1910.
2. Shaw, E. Clay: A Study of the Curve of Elimination of Phenolsulphonphthalein by the Normal and Diseased Kidneys. Jour. Urol., **13**:575, 1925.
3. Ellis, L. B.; and Weiss, S.: Normal Variations in Renal Function Tests with Discussion of Their Physiologic Significance. Amer. Jour. Med. Sci., **186**:223, 1933.
4. Marshall, Jr., E. K.; and Vickers, J. L.: The Mechanism of the Elimination of Phenolsulphonphthalein by the Kidney: A Proof of Secretion by the Convoluted Tubules. Johns Hopkins Hosp. Bull., **34**:1, 1923.

DISCUSSION (*Abstract*)

Dr. A. J. Crowell, Charlotte, N. C.—I think you will all agree with me when I say that Rountree and Geraghty did one of the most valuable pieces of research

work when they established the value of phenolsulphonphthalein elimination as a kidney function test.

I think you will also agree with me when I say that Shaw rendered the medical profession an equally great service, probably greater from a clinical standpoint, when he established the value of the peak and curve of 'phthalein elimination. The total output establishes the general value of the kidney function, but the peak and curve indicate the severity of damage done, if any, and the operability in a given case. Their value in the prognosis of either medical or surgical cases, along with nitrogenous retention estimation, is inestimable.

The fifteen-minute estimations are more accurate, but we find that the half-hour readings in clinical cases are sufficient for all practical purposes. When the peak is delayed beyond the first half hour, it is a definite indication that the kidney function is impaired and in proportion to the time of its delay, regardless of the total output in two hours or the amount of nitrogenous blood retention. Where damage has been done by back pressure, infection or other conditions, the rapidity with which the peak is restored to normal indicates the amount of damage done, the operability and prognosis in a given case. The term " 'phthalein elimination curve" is better than "the 'phthalein test." The curve is a more valuable clinical guide.

Dr. Shaw has demonstrated that two-thirds of the dye are fixed in the tissue or at least removed from the circulation five minutes after its injection, demonstrating that severely impaired kidneys may take up or store 'phthalein taken up from the circulation, but have difficulty in eliminating it.

Inflammatory processes delay secretion; impairment of circulation and tissue destruction reduce the total output. This is a valuable observation which enables one to ascertain fairly accurately the amount of recovery to be expected under proper treatment.

Dr. Edwin P. Alyea, Durham, N. C.—I have always been exceedingly interested in Dr. Shaw's excellent work on the 'phthalein curve as an index of renal function, particularly inasumch as I was one of the "experimental animals" he used in this work. Having been brought up in the Brady Clinic, I took it for granted that the work of Dr. Shaw had been generally accepted, and was somewhat shocked to find that men coming from various schools throughout the country, serving as house officers in our own clinic, were not familiar with this graphic method of recording 'phthalein excretion as an index of renal function. It was this lack of appreciation or understanding of this method that prompted a paper on this subject before a Virginia medical society a few years ago. It was then pointed out that Thomas, of Philadelphia, was probably the first to suggest the "index of elimination," as he termed it, in the use of indigo carmine. He compared the first twenty-minute collection specimen with the third twenty-minute specimen. Then Dr. Shaw came out with his interesting work on the "index of elimination" or the " 'phthalein elimination curve," as we prefer to call it. In the last ten years this has passed the clinical tests well and we might say, as Thomas did years ago, "that the index of elimination or the 'phthalein elimination curve and the blood urea have served well and faithfully." There are none better or more reliable as an indication of renal function and, we might add, as a measure of the reserve power of the kidneys. During this time a new test called the "urea clearance" was promulgated by Van Slyke, of the Rockefeller Institute. He claimed that this test was a more delicate one in detecting early renal insufficiency and was therefore superior to the 'phthalein. The "urea clearance" test is based on the old Ambard constant which was first described in 1914.

It is the $\frac{\text{Urine Urea}}{\text{Blood Urea}} \sqrt{\text{Vol.}}$

Van Slyke says that only after the urea clearance falls as low as 20 per cent of the normal do they find diminished 'phthalein secretion. However, I believe he is in error, because he took the total two-hour 'phthalein excretion collections rather than the fifteen-minute periods, as pointed out here today. This, of course, is of utmost importance and no comparison can be made between the two tests if the 'phthalein test is not carried out in this manner. To prove this to our own satisfaction, we carried out a series of tests on urologic patients; doing the urea clearance test along with the 'phthalein curve determination, and we are convinced that the urea clearance test does not approach the accuracy or the delicacy of the 'phthalein elimination curve. To mention a case: a boy had evidently a pyelonephritis following scarlet fever. Mosenthal tests on two occasions showed a concentration of 1.007 to 1.012. He had persistent alubmin, numerous white cells, red cells and casts in his urine. His 'phthalein test showed an appearance time of twenty minutes, with 10 per cent in the first half hour, 5 per cent in the second, 5 per cent in the third, and 5 per cent in the fourth; of course, a distinctly abnormal curve. In checking this against his urea clearance, we found the first test showed one of 85 per cent and the second one of 65 per cent, the first of which is considered normal and the second a low normal. This patient's nonprotein nitrogen was 58 mg. per cent. In this case, as in many of those we examined, we found that, contrary to the findings of Van Slyke, when the fifteen-minute collections of 'phthalein were done with the elimination curve it was far more sensitive than urea clearance. We also found that the urea clearance test was far from practical for most urologic patients.

Dr. Shaw has again discussed a very interesting line of thought in his elimination curve for unilateral kidney disease. We all recognize the element of error that is possible in collecting our specimens by means of ureteral catheter: (1) leakage around the catheter, and (2) reflex inhibition. He has taken care of the former by considering only those cases in which no 'phthalein was found in the bladder washings. As to reflex inhibition in normal kidneys, this may appear in one kidney with hyperaction on the opposite side; it may appear in both sides; or it may appear in one side with no change in the activity of the opposite

kidney. This error can be obviated only by making repeated determinations.

It is most interesting to hear that with unilateral disease the 'phthalein is absorbed from the blood just as quickly and completely as in a normal kidney. The second observation is interesting, namely, that the normal kidney working with a diseased one rarely puts out more dye than exactly one-half of a normal total secretion unless there is marked atrophy or tremendous destruction of the opposite kidney. With this in mind we reviewed several cases of tuberculosis of the kidney and found that, although none of these cases had tremendous destruction of the opposite kidney, in some the secretion in the first half hour collection was greater than one would expect from one kidney; they ranged from 35 to 40 per cent, then dropped off to 10 per cent and then to 5 per cent at the various half hour collections. This apparent hypersecretion from the good kidney in tuberculosis, I think, has been noted before, so that when we find a poor 'phthalein curve in renal tuberculosis, we are apt to believe that we are dealing with a bilateral infection. Several other types of cases were examined, some with ureteral obstruction, hydronephrosis, ureteral and renal calculi, and tumor of the kidney. In none of these did we find any increase in 'phthalein output in the first half hour collection from the normal kidney. We intend to continue this observation on various types of lesions.

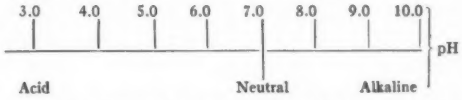
When Hinman did his monumental work on "renal counter-balance" he was of the opinion that there was no test at our disposal to show the potentiality or reserve power of the kidneys. I believe that intelligent interpretation of the fifteen-minute 'phthalein elimination curve does give us this information in bilateral disease. Whether it will be reliable in unilateral disease, considering the possibilities of error, I cannot say. We may be able to tell which kidney will thoroughly compensate so that the opposite obstructed kidney will go on to complete destruction even after the obstruction has been removed. This will aid considerably our clinical and surgical judgment in choosing between conservative or radical surgery. It seems to me that this whole subject of renal counter-balance may now very profitably be investigated again.

The two phases into which Dr. Shaw has divided the mechanism of 'phthalein elimination are most interesting, but I think, as he says, most pathological lesions affect both phases and we have an abnormal 'phthalein output as well as an abnormal elimination curve. It seems almost impossible to separate inflammatory reaction, interference with circulation, and tissue destruction; they are so interrelated and interdependent. Even with the combination of these three reactions, is not the recovery power of the kidney most remarkable? The renal function can be exceedingly poor and still recover sufficiently to keep the individual in nitrogen balance and permit prostatectomy. It shows again the shifting of the appearance time and the changes in the curve of elimination as the renal function improved. If we must wait for a long time (in one of my cases for two and a half hours for the 'phthalein to appear and then faintly) I question the clinical practical application to unilateral disease in helping us detect the kidney with reserve power.

NORMAL PHYSIOLOGIC DOUCHES*

By KARL JOHN KARNAKY, M.D.
Houston, Texas

Many are still prescribing alkaline (soda) douches and soda in combination with kaolin, and so on, in the treatment of vaginal leukorrhea, when it is a definitely known fact that the normal pH of the adult vagina is markedly acid, namely, pH 4.0; and as pathologic changes increase in the vagina, the hydrogen-ion concentration approaches the alkaline side. There results then, so to speak, a hypo-acidity of the vagina similar to hypochlorhydria of the stomach. A patient with hypochlorhydria is given acid; so if vaginal leukorrheas are to be treated scientifically, the vagina should be acidified rather than alkalinized. The following diagram may refresh our memory as to the significance of the symbol pH. pH 7.0 is neutral:



If a biopsy of the normal vaginal mucosa is examined for glycogen by Best's carmine stain and Lugol's solution and observed for discoloration; or if a vaginal smear is made after the vaginal walls have been sprayed with Lugol's and the epithelial cells are examined under the microscope for discoloration, the normal vaginal epithelial cells will be a dark brown, indicating saturation with glycogen.

If the pH of the normal adult vagina is estimated by direct indicator solutions, Hellige, Wulff, or the electrometric method, a pH of approximately 4.0 will be found. This normal mucosa will show a high glycogen-containing epithelium.

A smear and a culture from this normal vagina before any treatment is begun will usually reveal many Döderlein bacilli.

On the other hand, if the vagina has a leukorrhea there is a decrease in acidity (rare exceptions), a hypo-acidity (a pH of about 5.0 to 7.4), a decrease in glycogen, indicated by less iodine staining, less height in cell layers, and a decrease in the number of Döderlein bacilli,

*Received for publication November 2, 1936.

*From the Department of Gynecology and Obstetrics, University of Texas School of Medicine, Department of Laboratories and Research, Galveston, and the Leukorrhea Clinic, Jefferson Davis Hospital, Houston, Texas.

showing a pathologic vagina with "four hypos," namely,

(1) Hypo-acidity
(2) Hypo-glycogen,
(3) Hypo-Döderlein, and
(4) Hypo-epithelium.

Therefore, with these facts in mind, only acid douches should be used in the vagina.

Finding the vagina to have normally a pH of 4.0, the writer began to study electrometrically the amount of the acids commonly used in douches which would produce a pH of 4.0.* The following douches are recommended and gave these results:

(1) Vinegar (5 per cent acetic), three tablespoonfuls to two quarts of warm tap water, gave a pH of 4.0.

(2) Lactic acid (U.S.P.), one teaspoonful to two quarts, showed a pH of 2.85.

(3) Alum, one tablespoonful to a quart, yielded a pH of 3.10.

The same tests of alkaline douches showed them unfit for use. The results are:

(1) Sodium bicarbonate powdered, one tablespoonful to a quart of water, gave a pH of 8.10.

(2) Sodium chloride, one tablespoonful to a quart of water, showed a pH of 7.90.†

(3) Magnesium sulfate, one tablespoonful to one quart of tap water had a pH of 7.5.

(4) Sodium perborate, one tablespoonful to two quarts of water gave a pH of 10.09.

There is still a question in the mind of the medical profession as to the possible harm that may result from douching during menstruation. In the douching of 2,000 patients during menses, the author has noted no ill effects. The patients are persuaded to douche during the menses. When they express a doubt as to the advisability they are told: "Your grandmother or mother was advised not to douche with cold water, but if you use warm water with vinegar (5 per cent acetic acid) or lactic acid, it will do no harm." This statement usually convinces them. If they will not douche during the menses, they are told to insert into the vagina 2 to 5 acidulated dextrose-lactose tablets (pH 4.0) daily.

Douches are prescribed during the menses in certain conditions because the flow of alkaline blood at that time, when the pH rises to 7.0 to 7.4, favors the growth of trichomonads and other pathogenic organisms. That is the reason there is a flare-up, for instance, of trichomonal infestation after menses; it is due more to the alkalinity of blood serum rather than to any hormones contained therein. The reason that trichomonas infestation follows many cases of gonorrhea is that the resulting alkaline secretion (pH 7.2-9.0) neutralizes the vaginal acidity, so favors the growth of the trichomonads.

Conclusions.—(1) Normal physiologic douches (pH 4.0 to 3.0) should be used instead of alkaline douches (soda, salt, and so on), because with pathologic changes there is an hypoacidity of the vagina and as these changes increase, the pH approaches the alkaline side.

(2) Alkaline douches favor the growth of pathogenic organisms.

(3) Suitable acid douches, for example, the above described acetic douche and the lactic acid douche, inhibit or destroy such organisms.

(4) No harm results from suitable warm douches during menstruation, when such treatment is indicated.

2618 Crawford Street

*The douche should have a pH of 4.0 or less but should not be so low that it burns the vaginal mucosa. Menthol may be added for its soothing effect. Nitrazine paper can be used in the physician's office to determine the pH of secretions.

†Pathologic conditions make the vagina more alkaline, and so an alkaline douche merely adds to the existing injury. The Leukorrhea Clinic will be glad to determine free of charge the pH of any douche powder or solution sent it.

THE FRONTIERS OF ORTHOPEDIC SURGERY*

By Robert W. Johnson, Jr., M.D.
Baltimore, Maryland

The Chairman's Address this year is perforce upon a general subject and is in the main critical and perhaps tinged with some philosophic considerations. As a Baltimorean, I have no right to appear on this scientific program to flaunt either my learning or surgical skill before the local public, and in addition I personally have no liking to put before a meeting any scientific contribution which cannot be immediately questioned or attacked in open discussion. This will explain my choice of title, for I felt that a short survey of the present frontiers of our specialty might be of interest to you and perhaps serve to point out some areas where we are vulnerable.

*Chairman's Address, Section on Bone and Joint Surgery, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

Orthopedia has undergone an extraordinary expansion since the Greeks started to straighten the child and ceased abandoning cripples to the wolves. This expansion is highly desirable and I am sure it is both easier and far more effectual to be a bone and joint surgeon in Baltimore today than an orthopedist in Periclean Athens. However, expansion does not occur without increased obligations and even dangers, as anyone who has lived through 1929 must realize. It is the expanded field and widened scope of the activities involved in the present day treatment of the cripple that I am going to examine before you today, and try to point out where these dangerous weaknesses in our specialty seem to me to be appearing.

There can be no doubt that an orthopedic specialist of today must be a careful and skilled surgeon, which requires of him long training, a special technic, and even a distinctive point of view. But can we, whose primary training and interest are surgical, develop ourselves in the various other skills and technics important to the treatment of cripples and maintain a constant touch with and interest in non-surgical factors of really great importance? Let us look into some of these non-surgical factors, many of them being even non-medical, and see how we can hold the line of orthopedic therapy firmly and sanely without losing valuable ground or flying off on tangents chasing therapeutic rainbows. Our first obligation is to maintain contact with the scientific but non-surgical branches of medicine, keeping them under survey if not under careful scrutiny for developments which may have a definite bearing on our cases. Biochemistry is perhaps the most important fundamental science to us and it may discover factors enormously helpful in osteo-arthritis or spondylitis for example, just as it has already thrown much light on rickets. Again, in physiology, though each of us has made a frog's gastronemius twitch in a laboratory, we are quite ignorant of the pathological physiology of partially paralyzed muscles after polio or in the dystrophies for example. But to mention bone tumors brings up the tremendous amount of information we crave pathologically and in the x-ray field in this one group of cases, so I do not have to labor the point that we have to keep our scientific curiosity alive and our sensitive antennae active and exploring the neighboring territories for their new knowledge to increase our own understanding and powers. With the enormous volume of medical literature this is getting to be a real burden, somewhat alleviated by the abstracting journals and such friendly services as the "Reports on the Progress of Orthopedic Surgery." Those of us connected with teaching institutions have the advantage of close contacts with men in other branches and much is to be learned even in chance luncheon chats. That advantage, however, is about offset by the teaching duties which take time and energy that might otherwise be devoted to medical reading. I am sure that you are all conscious of this obligation to keep in touch with the advance guards of science, but being in the main younger and perhaps nimbler mentally you do not get quite as out of breath as I sometimes feel at the pace set. After much thought about this tremendous and ever-increasing flood of medical publication which seriously threatens the human ability to sift and digest, I feel that here we are facing an expansion which may become a blow-out. As a critic once said of Marie Corelli, "There is a diarrhea of words but a constipation of ideas." Censorship is abhorrent to the soul of science, but we must insist on more critical editorial selection and a higher standard of scientific worth before papers are accepted for publication. Publication really means a graft placed on the body of medical literature, and at times that body of beautiful truth seems to be pretty well messed up and obscured by the sloughing and stinking grafts which would not take there, but seem to survive in the lines of the *Index Medicus*. To offer a constructive suggestion, as well as mere criticism, let me advise meetings of more informal character where ideas can be brought forward and discussed, opinions aired, friendly criticism obtained, suggestions made and publication withheld. The necessity for formal publication detracts from the real value of many a paper and the discussion thereof, and so tends to rob our meetings of their spontaneity and interest. The one or two organizations to which I belong where the above rules hold good are the only ones whose meetings I make every effort never to miss, so full are they of interest, information and stimulus.

Following these criticisms of and suggestions relative to the general field of scientific advance and the literature, let me pass on to some of our own orthopedic responsibilities. Therapy in its many and varied forms is our direct concern, both in prescribing for our patients and as advisors to our medical confreres. I have made a list of seven primary forms of therapy

that we as orthopedists are supposed to be skilled in aside from surgery itself. I ask each one of you as I am asking myself, how much do we really know about these seven branches as compared with what we ought to know? We are all inclined to employ technical assistants and rely too much on their judgment, not only in the treatment of specific cases, but also in their estimate of the value of their particular form of therapy. A brief mention of these therapeutic agencies may make my point clearer. They are:

(1) Mechanotherapy. Braces, splinting, and all manner of supporting or fixative appliances. Only a small proportion of present bone and joint surgeons are as keen mechanics as the preceding generation of orthopedists were, and to the bracemaker is passsed the responsibility which is essentially ours. It is hard now to get our successors trained to do more than "call the brace shop," and many a young man is going out so inexperienced in this necessary department that one shudders for his patients' comfort. Operative skill has been bought by the loss of skill in this form of therapy.

(2) Massage. I shall never forget coming under the influence of Dr. Mennell at Shepherd's Bush in London during the war, for had I not learned something of massage then I know I never would have had such an opportunity again. Are there not many cases which warrant a more definite prescription to the masseuse than we have time or knowledge to give ourselves?

(3) Exercise. Perhaps many of you regard this as part of massage, but to us in Baltimore it seems important enough to rate a heading of its own. We are especially impressed by the prevalence of overdoses of exercise in polio cases, which in our opinion could arise only from a combination of lack of interest by the surgeon and over-enthusiasm of the therapist. There is in our opinion a definite need here for a greater watchfulness and interest on the part of the surgeon.

(4) Thermotherapy. Here we have a great therapeutic force which should engage a lot of our attention, especially in its most modern guise of electricity. But have we not much the same casual attitude about it that we have about massage: something to be turned over to a technician and let us hope the patient will not be blistered? How and why it helps is not of personal concern to most of us.

(5) Electrotherapy. When we arrive at this we are getting into something that is really "hot" to judge from the equipment one sees in the commercial exhibits of this meeting. Just because this is so active commercially it behooves us to dig below the surface and form our own judgments as to the efficiency of this or that apparatus, and the efficacy of this or that wave or ray. Unquestionably it is necessary to have modern weapons in our battle with disease, but even a torpedo is useless if it goes astray, so that we must remember that it is our job to aim our batteries to hit the mark. Shotgun therapy in this field is just as ignorant and indefensible as it was in the old days of prescriptions containing a dozen drugs or vaccines of many organisms.

(6) Hydrotherapy. The vogue of hydrotherapy is on the wane now only because it was over-enthusiastically and quite uncritically ballyhooed. It is our duty to curb this back swing of the pendulum of fancy with the facts of its solid worth when well used. The method merits our personal investigation even though it is a little hard on the uninitiated to tolerate the warm water very long. Only by personal immersion can we be sure that the method is being carried out properly on patients with whose muscle reactions on dry land we are already familiar.

(7) Finally on the therapeutic side there is a little used form with which I am fortunate in having had considerable wartime experience, namely, the curative workshop, and concerning its efficiency I am by conversion an enthusiast. Industrial life is even more arduous in its demands than the military service was, and yet we are expected to restore our industrial casualties to activity without the reconditioning that the service man got in the convalescent camps and with more rapidity. For instance, when a stevedore is expected to go back to full time stevedoring after three months out with a back injury, can one be surprised at the frequent resultant breakdowns? I feel it is our duty to initiate and foster this widely neglected form of therapy which has much to offer, not only

to the physician and patient, but also to the employer and insurance company.

After this brief resumé of the therapeutic agencies which we must know thoroughly to use properly, let us turn and examine another frontier of our chosen field, the safeguarding of which consumes a lot of our time and thought, namely, the boundary impinging on the state, the social border. By this I mean the ever-increasing importance of our public obligations as distinct from the private physician-to-patient one. With the increasing paternalism of our social evolution our relation to both state and Federal government has become closer and more demanding. This is an era of programs and projects with a motive power of humanitarianism of huge potentiality. The gearing of this power to the present condition of our roadbed and its direction along the road between the ditches of extravagance and waste on the one side and the mudholes of bureaucratic inaction on the other calls for thought, sagacity, vision and not a little courage on the part of the orthopedists who really know more about the problem of the cripple than any layman and politician possibly can. We must give time and thought, as well as service, to this development and expansion of our activities. No longer do we simply serve the patients who seek us out; we must now go out and help the Government beat the bushes until no cripple escapes. This is a new phase distinctly and one which calls for careful and prayerful consideration, in order that our cordial relations with the state authorities on the one hand and the public on the other may not become strained by overzealousness and lack of consideration of the lay point of view. Again, though one would think that state and Federal aid might help us with our professional burden by provision of hospitalization, and so on, and so diminish our dependence upon individual and community charity, such has not been our experience. We must still rely on local generosity and goodwill to give us our main assistance, so that every orthopedist must cultivate his particular community relationship to carry on his work as it should go. This requires no little time and effort in itself and entails a stewardship to the community involving tasks for which he may have little liking or aptitude, such as hospital administration, community drives, educational campaigns and a host of lesser evils. The organization and conduct of outside scattered clinics in rural sections is no small part of this social frontier, calling for qualities which have no connection whatever with surgical skill or experience. I sometimes think that we have digressed more from the original orthopedia in this social direction than in any other, but as the object of all this legislative and sociological activity is the crippled child, I feel it must be included in the new orthopedia.

Finally there is the educational frontier which has a number of projecting salients. Of these the widest and deepest is the duty of public education. We have perhaps given the public too exalted an idea of the power we possess to rehabilitate the cripple physically. People have come to expect miracles and when, in the language of "Green Pastures," "we fail to pass a miracle" on some hopeless case, there is disappointment and even resentment at times. We must deflect the limelight from ourselves back onto the public, and teach them their responsibility toward the cripple in providing not merely the opportunity for miraculous surgery, but a systematic training in grade and vocational schools. We must further educate the public to use our cripples in trade and industry in those jobs which they can do better than their whole but untrained competitors. Our patients must have an outlet for their energies and their special gifts. This is the prime need of the cripple today, and while much is being done in some quarters there is still an enormous sales-resistance to a cripple on a job which we must help break down.

Another important salient in the educative field is that of professional training. This training is a pleasure, a duty, or a burden to us, depending largely on our state of fatigue. First we must continue to teach ourselves constantly by meetings such as this, by reading, and by observation, for unless we are trying to learn we are poor teachers of our successors. Students, interns, even residents, all need to be taught as much as we can show them. But our lessons should not cease by telling them all we know, we must also tell them all we do not

know, and just what we should like to find out. No student has any interest in something that is fully known. Give the foundations of facts and experiences, even the dull details of brace-making, for instance, but let the next generation have the freedom and excitement of its own attack on our many elusive problems. Each of us, whether connected with formal teaching institutions or not, has this opprtunity of moulding and developing a better orthopedist than himself to follow on in the high task of "straightening the child."

From this very sketchy review of the wide sweep of the frontiers of orthopedics and of our multitudinous duties therein, I think it is apparent that we, as a group and as individuals, are called upon to use many gifts and do many tasks far, far removed from surgery. In fact our job ranges from biochemical investigation to practical political lobbying, and from high frequency waves to addressing a Rotary club or medical meeting, which may be its fascination as well as its weakness. How are we to deal with such an unwieldy mass? Perhaps some of us will become specialists within a specialty, others resort to trusting extensively to specially trained technicians, yet others devote themselves to investigation or the social aspects of our work, but some will have to try to maintain that breadth of interest and activity that will enable them to guide the progress of our particular art along an orderly and wise course. This broad sort of leadership is as open to a man in a small community as to one in a great medical center. In fact the individual whose work embraces all forms of orthopedic activity is often better fitted for such leadership by the very variety of his experience than a man in a medical center where too often there is a tendency for him to concentrate his interest upon a few phases of orthopedics. Let us, each of us, develop the habit of stepping back from time to time from our immediate daily task, be it the clinic or the laboratory, and trying to see the whole panorama of this job which is ours, the healing and rehabilitation of the cripple, for only in this way can we learn to keep our proper balance and also experience the full satisfaction that our work can afford.

EXPERIENCES WITH LIBERAL CARBOHYDRATE DIETS IN DIABETIC CHILDREN*

By HUGH L. DWYER, M. D.
Kansas City, Missouri

During the past decade the use of a more liberal diet for diabetes has become increasingly popular. This has resulted in the prescribing for diabetic children, diets that closely approach those of the normal child in the partition of carbohydrate, protein and fat. Such a radical departure from our preconceived ideas concerning the restriction of carbohydrate has by no means enjoyed universal approval. There are some students of diabetes who adhere to the carbohydrate restrictions of the pre-insulin era, contending that this lessens the need of exogenous insulin and tends to promote carbohydrate tolerance. On the other hand, there is clinical and laboratory evidence to support the contention that a low carbohydrate diet does not promote tolerance, nor does it greatly influence the dose of insulin.[1] On the contrary, it appears that occasionally smaller doses of insulin are required when the carbohydrate is increased. It has been suggested that carbohydrate stimulates the pancreas and also that an excess of fat inhibits the action of the insulin. Whatever the merits of these claims, there can be no doubt that a liberal diet, one that resembles that of the normal child, will contribute to the comfort, growth and well-being of the diabetic child. If this can be given without impairment of tolerance and a great increase of insulin, it merits our careful consideration.

Himsworth,[2] a physiologist, working with rabbits, investigated the dietetic factors influencing the glucose tolerance and the activity of insulin, and arrived at the following conclusions:

(1) A diet rich in fat decreases sugar tolerance; retards the action of insulin on blood sugar; prevents or delays improvement of sugar tolerance, which occurs on the injection of glucose in consecutive doses and impairs the ability of insulin to diminish the hyperglycemia following intravenous injections of glucose.

(2) A diet rich in carbohydrates improves sugar tolerance; accelerates and improves the depression of blood sugar by insulin; favors

*Read in Section on Pediatrics, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

the progressive improvements of sugar tolerance after consecutive injections of glucose and does not impair the action of insulin in reducing the hyperglycemia after intravenous injections of glucose.

Other workers have found that these same phenomena occur in starvation. Himsworth explains this on the basis that high fat diets and starvation diminish the susceptibility of the animal to insulin, while carbohydrate diets and the administration of glucose increase the susceptibility to insulin.

In the extremely high fat, low carbohydrate diet—that advocated by Newburgh, for example—the fat forms 75 per cent, and carbohydrate 10 per cent of the total calories, while the opposite extreme is represented by diets in which the fat comprises 22 per cent, and the carbohydrate 63 per cent of the total calories.[4]

In the diabetic service of the Children's Mercy Hospital we have used at various times, high fat diets, high carbohydrate diets, and various gradations between the two extremes. Until 1929 we used diets in which the fat made up 65 per cent of the total calories and carbohydrate 18 per cent. At this time diets are used in which the carbohydrate represents 48 per cent and the fats 36 per cent of the total calories. This is approximately the relation of these elements in the normal child's diet.

For the purpose of presenting our experience with the liberal use of carbohydrate, we have reviewed the records of 46 diabetic children—21 of whom have been on both types of diet, the low carbohydrate with high fat, and the so-called "normal" diet. These children were in the hospital, although not necessarily confined to bed. Enough insulin was used to control glycosuria and keep the blood sugar near the upper limits of normal, although we relied principally on the urine examinations to determine the dose of insulin. An effort was made to get the patients under control as soon as possible and keep them aglycosuric by using sufficient insulin.

Data on our earlier cases on the extremely high fat diets are not sufficient to make exact comparisons, but in general it may be stated that our patients were on the verge of ketosis much of the time. Sharp daily variations in blood sugar were common and both hyperinsulinism and coma occurred frequently. About one-half our cases required a smaller dose of insulin when the carbohydrate was greatly restricted, but this difference was out-balanced by the advantages of a higher carbohydrate diet.

Upon changing to a more liberal carbohydrate allowance, 12 of the 21 children actually needed less insulin. In a few cases the carbohydrate was trebled, resulting in a temporary increase in insulin dosage, which eventually tapered off to a dose one-half as large as required when on the low carbohydrate diet. On the liberal carbohydrate diet we were no longer concerned with acidosis, the daily blood sugar was more stable, and complications much less frequent. The general health and well-being was greatly improved and dietary infractions were much less frequent.

The following case histories illustrate the effect of increased carbohydrate on the insulin requirements:

Case 1.—(Table 1) James B., aged 9 years, 69 pounds (31 k.) 53 inches, entered the hospital in December, 1935. The patient was in his third yenr of diabetes. His diet was made up of C 130 grams, P 80 grams, F 90 grams, giving 1650 calories, about 50 per cent from the fat. This gave 24 calories per pound (53 per k.)

His daily dose of insulin varied between 25 and 30 units on this diet for seven months, in which time he had gained 2 pounds. July 19, 1935, his diet was increased at one stroke to C 240 grams, P 80 grams, F 80 grams; giving 2000 calories, about 50 per cent from carbohydrate. The need for insulin suddenly decreased until two weeks later he was taking only 5 or 6 units daily. With the better balanced diet, which approximates that of the normal child, he gained 3 pounds in three months, and never requires more than 2 units of insulin daily, often going two weeks without insulin.

Case 2.—(Table 2) Virgil M., aged 10 years, 53 pounds (24 k.), 52.5 inches, was in his third year of diabetes and was aproximately 15 pounds underweight. He entered the hospital July 12, 1934, on a diet of C 60 grams; P 60 grams; F 90 grams, which gave 1290 calories (53 per k). He required 30 units of insulin daily.

He was increased to 1650 calories (70 per kilo), made up of C 130, P 80, F 90, and got along on 25 to 30 units of insulin each day for the next year. October 13, 1935, he returned to the hospital in coma, probably resulting from a respiratory disturbance. He was given a diet of C 210 grams, P 70 grams, F 70 grams, and sufficient insulin to control the hyperglycemia incident to his infection, which lasted about three weeks. From that time his insulin dosage has decreased to 10 units daily.

In his first diet, 1290 calories were made up of C 14 per cent, P 26 per cent and F 60 per cent, whereas the later diet of 1750 calories was composed of C 48 per cent, P 16 per cent and F 38 per cent. Thus the carbohydrate was increased 3½ times, while the insulin was decreased to one-third that required on the low calorie, low carbohydrate diet.

Table 1

JAMES B., 9 YEARS, DIABETES 3 YEARS

	C	P	F	Cal. per K,	Blood S.	Urine	Insulin	Weight	Height
12/14/35	130	80	90	53	181	2 plus	25 U.	69 pounds	53 inches
1/29/36	130	80	90		167	2 plus	25 U.		
1/31/36	130	80	90		231	3 plus	25 U.		
2/ 4/36	160	80	90	57	220	3 plus	20 U.		
2/ 8/36	160	80	90		250	3 plus	24 U.		
2/12/36	160	80	90		212	3 plus	24 U.		
2/19/36	160	80	90		192	2 plus	27 U.		
2/26/36	130	80	90	53	162	2 plus	32 U.		
3/ 4/36	130	80	90		141	1 plus	32 U.		
3/11/36	130	80	90		125	0	30 U.		
3/19/36	130	80	90		146	0	25 U.		
3/27/36	130	80	90		147	1 plus	25 U.		
6/ 3/36	130	80	90		154	0	25 U.		
6/ 5/36	130	80	90		136	0	25 U.		
6/ 8/36	130	80	90		114	0	25 U.		
6/13/36	130	80	90		143	0	25 U.		
7/19/36	240	80	80	65	133	0	20 U.	71 pounds	54 inches
7/21/36	240	80	80		260	3 plus	17 U.		
7/28/36	240	80	80		180	1 plus	4 U.		
7/31/36	240	80	80		180	1 plus	6 U.		
8/ 4/36	240	80	80		113	0	5 U.		
8/11/36	240	80	80		152	0	5 U.		
8/13/36	240	80	80		130	0	2 U.		
8/18/36	240	80	80		102	0	8 U.		
9/19/36	240	80	80	59	93	0	2 U.	74 pounds	56 inches
10/26/36	240	80	80			0	0 to 2 U.		

Table 2

VIRGIL M., 10 YEARS

	C	P	F	Cal. per K.	Blood S.	Urine	Insulin	Weight	Height
7/13/34	60	60	90	54	295	4 plus	30 U.	53 lbs. (24 k.)	
7/21/34	70	100	100	66	267	3 plus	30 U.		52½ inches
8/ 3/34	70	100	120	73	160	1 plus	30 U.		
1/30/35	160	80	90	74	213	2 plus	30 U.		
2/25/35	140	80	90	70		1 plus	27 U.		
3/ 8/35	130	80	90	69		1 plus	25 U.		
6/13/35	130	80	90	69	143	1 plus	25 U.		
10/14/35	130	80	90	69	446	Coma	280 U.		
10/16/35	210	70	70	58	292	4 plus	55 U.	65 lbs. (30 k.)	
Oct. 35	210	70	70	58	222	3 plus	64 U.		
Nov. 35	210	70	70	58	200	1 plus	36 U.		
Dec. 35	210	70	70	58	176	1 plus	10 U.		
Jan. 36	210	70	70	58	160	0	10 U.		
Feb. 36	210	70	70	58	158	0	13 U.		
Apr. 36	210	70	70	57	141	0	10 U.	69 lbs.	
June 36	210	70	70	57	106	0	20 U.		
July 36	210	70	70	57	130	0	25 U.		
Aug. 36	210	70	70	57	106	0	17 U.		
Sept. 36	210	70	70	53	140	0	9 U.	71 lbs.	56 inches
10/23/36	210	70	70	53	116	0	9 U.		

Case 3.—(Table 3) Walter H., aged 2½ years, 27 pounds (12 k.) 36 inches, had had diabetes for only one month when he entered the hospital April 15, 1936. He was given 50 units of insulin during the first night and day following admission, but this proved to be too much and depressed the blood sugar to 46 mg. per 100 cc. He was given a diet of 750 calories (62 per k.), made up of C 90 grams, P 30 grams, F 30 grams, and was controlled with 13 to 19 units of insulin daily.

The carbohydrate was then increased to the very high figure of 14 grams per kilogram body weight, at which time he was taking 1420 calories (109 per k.), composed of C 170 grams, P 45 grams, F 60 grams. He took this extreme diet for only two weeks with a gradually decreasing dose of insulin. When he started to refuse his food he was changed to C 140 grams, P 45 grams, F 40 grams, giving 73 calories per kilogram, and during the next month in the hospital required only 4 units per day. In six months he gained 6 pounds in weight, and 1 inch in height, and requires 12 units of insulin daily.

The child's record is too short to determine what course his diabetes will take on this diet, but it is of interest in that it shows that the extreme diet did not require more insulin than one more conservative.

Case 4.—(Table 4) John M., aged 12 9-12 years, 82 pounds (37 k.), 63 inches, entered the hospital January, 1935, because of an eye injury and sugar was found in his urine. He was placed on a diet composed of C 100, P 80, F 90, and given 5 units of insulin once daily. He continued on this type of diet, which was obviously inadequate, and 5 units of insulin each day until November, 1935.

Table 3

WALTER H., 2½ YEARS, DIABETES 1 MONTH

	C	P	F	Cal. per K.	Blood S.	Urine	Insulin	Weight	Height
4/16/36	90	30	30	63	212	4 plus	50 U.	27 pounds	36¼ inches
4/17/36	90	30	30		46	0	0 U.		
4/20/36	90	30	30		192	3 plus	20 U.		
4/24/36	130	40	45	90	115	0	18 U.		
4/28/36	130	40	50		143	0	13 U.		
5/ 6/36	130	40	50		116	0	19 U.		
5/ 8/36	150	45	60		154	1 plus	8 U.		
5/12/36	170	45	60	109	107	0	12 U.		
5/15/36	170	45	60		143	0	8 U.		
5/18/36	170	45	60		115	0	6 U.		
5/25/36	170	45	60		0	0	7 U.		
5/30/36	140	45	40		115	0	9 U.		
6/ 4/36	140	45	40	80	90	0	4 U.	31-10/12 lbs.	36¼ inches
6/12/36	140	45	40		90	0	4 U.		
7/31/36	140	45	40		118	0	12 U.		
9/11/36	140	45	40		122	0	12 U.	33 pounds	37½ inches
10/12/36	140	45	40		100	0	9 U.		

Table 4

JOHN M., 13 YEARS

	C	P	F	Cal. per K.	Blood S.	Urine	Insulin	Weight	Height
Jan. 1935	100	80	90	41	148	1 plus	5 U.	82 pounds	63 inches
Feb. 1935	100	80	90		115	0	5 U.		
Mar. 1935	100	90	100	44	102	0	5 U.		
11/11/35	100	90	100		160	2 plus	5 U.		
11/12/35	240	80	80	54	219	3 plus	30 U.	84 pounds	63 inches
11/19/35	240	80	80		100	0	22 U.		
12/ 1/35	270	90	90	57	100	0	17 U.		
12/ 7/35	270	90	90		122	0	7 U.		
12/14/35	270	90	90		118	0	2 U.		
12/21/35	270	90	90		117	0	5 U.		
1/21/36	270	90	90		100	0	5 U.		
8/28/36	270	90	90		110	0	5 U.		
10/23/36	270	90	90	52	112	0	4 U.	94 pounds	66 inches

Table 5

GORDON C., 7 YEARS, DIABETES 2½ YEARS

	C	P	F	Cal. per K.	Blood S.	Urine	Insulin	Weight	Height
3/ 6/36	100	40	40	50	267	4 plus	15 U.	40 pounds	45½ inches
3/13/36	120	40	40	55	157	1 plus	15 U.		
3/20/36	150	45	45	66	222	3 plus	15 U.		
3/28/36	150	45	45		198	3 plus	30 U.		
4/ 3/36	150	45	45		143	1 plus	20 U.		
4/10/36	150	45	45		95	0	7 U.		
4/14/36	150	45	45		149	0	7 U.	42 pounds	
4/22/36	150	45	45		112	0	7 U.		
5/25/36	150	45	45		91	0	7 U.		
9/15/36	150	45	45		100	0	7 U.	42 pounds	47 inches
10/12/36	150	50	50	66	83	0	7 U.		

At that time he returned to the hospital because it was evident from his urine testing that the glycosuria was increasing. He had lost 2 pounds in nine months, and had not been very strict with the diet.

He was immediately changed from C 100, P 90, F 100 to C 240, P 80, F 80, which caused the dose of insulin to increase to 20 to 30 units daily. Within three weeks a further increase was made to C 270, P 90, F 90, and this resulted in a marked drop in the dose of insulin. For nearly a year he has continued on this diet, he has gained 12 pounds, grown 3 inches, and at this time requires only one dose of 4 units of insulin daily.

Thus, throughout the greater part of 1935 he received a diet of 1740 calories or less, 28 per cent of it from carbohydrate, and in 1936 a better balanced diet of 2250 calories, 48 per cent from carbohydrates, without increasing his insulin requirements.

Four children of the 21 in whom the high carbohydrate was substituted for the high fat diet did not respond by requiring less insulin. All of these were in the adolescent period, undergoing rapid growth, and had had diabetes between three and four years. The carbohydrate was increased gradually from 100 grams to 300 grams per day. This always required a considerable increase of insulin. Even when the high carbohydrate was subsequently lowered, the insulin requirement showed no comparable tendency to decrease. We found it somewhat difficult to compare the course of diabetes and the effect of diet and insulin in adolescents with that of younger children. It is very likely that activity of the endocrines and other unknown factors peculiar to this age-period influence carbohydrate metabolism, and that it is not possible to estimate the force of these factors or the time they become manifest in different children. This impresses one with the limited value of any studies on diabetes made by comparing various diets and insulin needs over a short period. In other words, a longitudinal study of diabetes in children, as has been done in tuberculosis, is no doubt the proper way to evaluate any therapeutic method.

Our experience leads us to believe that the diabetic child will often do as well on a diet that closely resembles that of his brothers and sisters as he will on one in which the carbohydrate is greatly restricted and the caloric deficiency made up with fat. Of course, the diabetic will not be able to tolerate "bouts" with carbohydrate, as does the normal child, and candy, pastry and other sweets will have to be curtailed. We have adopted a simple method of computing a diet for diabetes that conforms closely to the average diet of the normal child, except possibly for a slight deficiency in calories.

ESSENTIALS OF THE DIET

It is generally agreed that the diabetic child should have sufficient calories and that the protein should never fall below a certain minimum considered essential for growth and well-being. Under-nutrition may be advantageous in the management of diabetes in adults, but it has no place in the treatment of the child. A low caloric diet and under-nutrition does not increase the child's tolerance for carbohydrates, nor does it decrease the need for insulin, except possibly for short periods.

The importance of the various food elements may be outlined as follows:

Protein.—The protein requirement for the child is more or less fixed. The minimum has been placed at 1.8 to 2.3 grams per kilogram body weight. The younger child needs slightly

more than the older child. It is generally estimated that 10 to 20 per cent of the total calories should come from protein. Insufficient protein may retard growth. Given in excess, that is, more than 20 per cent of the total calories, it increases the metabolic rate and this is not desirable.

Carbohydrate.—Carbohydrate supplies energy, spares protein, and is essential to the proper utilization of fat. A correct ratio of carbohydrate to fat must be maintained if the accumulation of fatty acids is to be avoided. In the normal child's diet carbohydrate furnishes 40 to 60 per cent of the total calories. Holt and Fales found in a group of normal children that the carbohydrate consumption averages 10 grams per kilogram body weight per day.

Fat.—A very wide latitude in the amount of fat in the diet is compatible with good health. In one hundred normal children, Holt and Fales found that three-fourths of them took between 2 and 4 grams of fat per kilogram per day. It would appear that a child of school age should take not less than 2 grams per kilogram each day and an extremely active child of 14 or 15 years as much as 4 grams.

In the diet of normal children the fat accounts for from 20 to 50 per cent of the total calories, approximately twice that furnished by protein. Thus a ratio of 1 gram of fat (9 calories) to 1 gram of protein (4 calories) gives the proper relationship.

Therefore, the normal child's diet consists of approximately 50 per cent carbohydrate, 15 per cent protein, and 35 per cent fat. This ratio may be obtained when the diet contains approximately 3 grams carbohydrate to 1 gram of protein and 1 gram of fat.

We have practiced a very simple method of computing the diet, which lends itself to the teaching of medical students, interns and nurses. At least it furnishes a starting point and can be modified to conform to individual requirements.

DIABETIC DIET FOR CHILDREN

During the time the child is in the hospital he needs about 25 per cent less calories than when he is more active at home. A diet of 3 grams carbohydrate; 1 gram protein and 1 gram fat to each pound of body weight will give 25 calories per pound, or 55 calories per kilogram. For the older child, 6 to 12 years, this is usually sufficient. It gives 2.2 grams of protein per kilogram, which is also sufficient. The younger child needs slightly more protein, as well as more calories. Therefore, the diet may be computed in this manner and then increased by one-fourth or one-third. In this method it is presumed that the child is of normal weight, or nearly so, for his age and height.

In a diet containing 3 parts carbohydrate to 1 part protein and 1 part fat, carbohydrate represents 48 per cent, protein 16 per cent and fat 36 per cent of the calories, and this closely approximates their relation in the normal diet. Such a diet is well balanced and palatable, and therefore, dietary infractions are uncommon and the child is more likely to co-operate than he is on a diet that differs greatly from that of his normal brothers and sisters.

The computation of the diet may be illustrated as follows:

A boy, aged 10 years, weight 70 pounds, (33 k.)

With carbohydrate, protein and fat in the ratio of 3-1-1 grams respectively, per pound body weight, his diet would consist of:

C 210 grams, P 70 grams, F 70 grams.

This gives 2.2 grams of protein and 55 calories per kilogram. The 1750 calories are distributed as follows:

Carbohydrate, 48 per cent
Protein, 16 per cent
Fat, 36 per cent

We believe that for older children this is adequate in calories and in protein. When the child becomes more active he may need a slight increase and individual adjustments can be made.

Children under five years of age, because of rapid growth, may be given slightly more protein and more calories. The diet may be computed in the manner described and then augmented by an increase in protein, or perhaps in total quantity as the physician desires. For example:

A girl, aged 5 years, weight 40 pounds (18.1), given 3 grams of carbohydrate, 1 gram protein and 1 gram fat for each pound of body weight, would receive:

C 120, P 40, F 40.

Increased by one-fourth the diet would contain:

C 150, P 50, F 50.

This furnishes 2.9 grams of protein and 70 calories per kilo., which may be considered adequate at this age.

The meals are apportioned so that two-fifths of the total are taken at breakfast and supper and one-fifth at lunch. We do not make frequent changes in the diet, except that carbohydrate may be transferred from one meal to another, breakfast to lunch or vice versa, in an effort to obtain sugar-free urine specimens both forenoon and afternoon, from the dose of insulin given before breakfast.

ADMINISTRATION OF INSULIN

At the beginning we believe it is important to use enough insulin to get the child well under control. At this time five or six urine specimens should be examined each day and an effort made to get the urine free from sugar. Blood sugar determinations are made from time to time as a check. It may be necessary in severe cases to give insulin four or five times during the day and night, but as soon as the patient is under control we make a special effort to give only two doses daily, before the morning and before the evening meals. We then follow a method described by Bader[5] for arriving at the dose of insulin necessary to control the disease before the child is discharged from the hospital.

When two doses of insulin are given each day the morning dose should be sufficient to control the before-lunch and before-supper urine specimens. In other words, the early morning dose will control the metabolism of carbohydrate taken at breakfast and lunch, which is three-fifths of his daily intake. Therefore, approximately three-fifths of the total dose of insulin is given before breakfast.

Both doses of insulin vary from day to day, increasing or decreasing as the case may be, until one arrives at the minimum dose necessary to control three urine specimens: the first taken before the breakfast insulin, the next before the noon meal and the third immediately before the supper insulin.

The supper dose of insulin is increased 2 units each day until the night urine, the early morning specimen, becomes sugar-free. Then it is decreased 5 units or less each day until sugar reappears in the night urine, when it is increased 2 units each day as before. By increasing and decreasing in this manner, we arrive at the basal dose of insulin required during the night.

The breakfast dose of insulin is given in the same manner, increasing 2 units each day if necessary, until either the forenoon or afternoon urine becomes normal. When this occurs in one specimen, some of the carbohydrate, 5 or 10 grams are transferred from the meal immediately preceding, to the other meal. When both specimens are free from sugar the dose is decreased 5 or less units each day until sugar reappears, then increased by 2 units daily until sugar disappears. By increasing or decreasing the dose of insulin and redistributing the carbohydrate between breakfast and lunch, the minimum dose of insulin needed to control glucose metabolism during the day is determined.

SUMMARY

Our experience with diabetic children on a diet that closely approximates the diet of the normal child in the partition of carbohydrate, protein and fat leads us to believe that it has many advantages over diets of low carbohydrate and high fat. Complications such as coma and hypoglycemia have been less frequent. The blood sugar tends to be more stable. Oftentimes less insulin is needed when the carbohydrate allowance is increased to 50 per cent of the total calories, the patient is more cooperative, diet infractions are less common, and increased gains in height and weight are noteworthy.

A simple method of computation for this type of diet is described, in which 3 grams of carbohydrate and 1 gram of protein and fat, are given for each pound of body weight. The total calories are made up of carbohydrate 48 per cent, protein 16 per cent and fat 6 per cent, which differs very little from the normal diet.

BIBLIOGRAPHY

1. Geyelin, H. R.: J.A.M.A., **104**:1203 (April 6) 1935.
2. Himsworth, H. P.: J. Physiol., **81**:29 (March 29) 1934.
3. Newburgh and Marsh: Arch. Int. Med., **31**:455 (April) 1923.
4. Rabinowitch, I. M.: Diabetes Mellitus, MacMillan, Toronto.
5. Bader, G. B.: Jour. Pediat., **4**:77 (Jan.) 1934.

DISCUSSION (*Abstract*)

Dr. T. Cook Smith, Louisville, Ky.—We are glad to hear Dr. Dwyer give further evidence that the diabetic child does well in all respects on a liberal carbohydrate allowance. In other words, the diabetic child can and probably should be fed the diet of a normal child. This is in marked contrast with the pre-insulin days when it was considered satisfactory if we kept the diabetic child alive under any circumstances.

In a limited experience it is my impression that the diabetic child eating a liberal carbohydrate allowance goes into and comes out of infectious diseases with fewer symptoms and findings of ketosis than does the same child on a high fatty acid glucose ratio.

The mental hygiene of the diabetic child assumes great importance in a few cases. The child is grateful

for a diet looking and tasting like that of his associates. It also gives him a feeling of being safer from the extremely unpleasant symptoms of insulin shock. It is unnecessary, I am sure, to mention here the fact, known to most parents, that diabetic children feel best when showing a slight trace of sugar.

It seems that the diabetic child in choosing his own diet will not select a ketogenic one under ordinary circumstances. I recently was analyzing the published self chosen diets of some of Dr. Butler's patients in which the only restriction was one placed on eating large amounts of carbohydrate, and in these diets the children in no instance chose sufficient fat to produce a ketogenic ratio.

Joslin, Bloor, Rabinovitch and others have shown that the high cholesterol blood findings in diabetics may be kept within normal limits by using a more liberal carbohydrate ratio. Warren discusses the possible association between this high cholesterol finding and the arteriosclerosis found in diabetics of all ages.

An autopsy done on a little colored boy whom I had seen from time to time from the age of eighteen months to ten years, showed atheromatous placques in the aorta. This patient had been under my care from 1925 through 1930 and most of that time he had been on a high fat diet. Is there any relationship between that type of diet and the findings in this patient's aorta?

We need many reports such as that given by Dr. Dwyer today because most of us do not see a large enough number of child diabetics to draw conclusions.

Dr. C. M. Burpee, Augusta, Ga.—After fourteen years of treating diabetes in children with insulin, we must admit that the ideal diet for diabetic children is still unknown. Insulin has not simplified the treatment of diabetes, but rather it has made the treatment more complex. This may be readily seen from the multiplicity of diets advocated today. However, much progress has been made in the past ten years, but much more information concerning the diabetic child is still needed before we can decide which diet is best for him. Perhaps this information will be forthcoming in the future, but until then we shall have to continue experimenting with different types of diets.

It is reasonable to assume that the more nearly the diet of the diabetic child approaches that of the normal child the more desirable it will be, as it will remove the feeling of inferiority that sometimes develops in these children, and the child will also be less likely to break his diet. However, one must always remember that he is dealing with a diabetic child and the diabetes must be controlled at all times. This is recognized by the most ardent exponents of the high-carbohydrate low-fat diet and they attempt to keep the hyperglycemia under control. Likewise it is desirable to see that the child is properly nourished, but not overnourished. Every diabetic child should be treated as an individual, rather than made to conform to some set diet if best results are to be obtained. The metabolic processes are different in different children and while one child may do well on one diet another may not. Some children are more active than others and can utilize more food without becoming overnourished. All of these factors have to be taken into consideration in planning the diet.

Joslin has shown that diabetics who live the longest are those who have had liberal quantities of carbohydrates in their diets. It has also been shown that in those countries where carbohydrates made up a large portion of the diet the diabetes is of the mild type. Deaths from diabetic coma today are not due to an inability to utilize carbohydrate, but rather to insufficient carbohydrate to utilize. It is also well known today that an increase in the carbohydrate does not throw an extra burden on the pancreas in most cases, but rather seems to stimulate it to greater activity, as is shown by the decreased quantity of insulin necessary to control metabolism of the increased carbohydrate. There are some cases, however, that do not show this increased tolerance for carbohydrates. These are the mild diabetics who do not require insulin in their treatment.

The formation of ketones is a regular feature of diabetes, and this leads to other metabolic disturbances such as depletion of the body of fixed base which in turn leads to dehydration, which further complicates the picture. And since the diabetic child of today lives longer, a diet high in fats is also likely to lead to other complications such as arteriosclerosis and cataracts, which are found more frequently in the adult diabetic. It has been said that diabetes begins with an excess of fat and from an excess of fats diabetics die, formerly of acidosis and now of arteriosclerosis. With blood sugar or cholesterol below 200 mg. no cases of sclerosis or cataracts developed in Joslin's series. Above this level the number that developed it was directly proportional to the increase in the sugar or cholesterol. It would, therefore, seem highly desirable to have a diet that would remove the patient from the verge of acidosis and make its attending complications and death less likely. Such a diet is one that has liberal quantities of carbohydrates, but this does not imply excessive quantities of carbohydrates.

While there are many advantages to be derived from a diet with liberal amounts of carbohydrates, our experience has led us to believe that in severe diabetics it is inadvisable to use such quantities of carbohydrates as may be used with a normal child. The blood sugar level becomes much more labile and glycosuria and insulin reactions more frequent and regulation also becomes more difficult. These patients frequently develop infections of the skin which further complicate their treatment. We seldom increase the amount of the carbohydrates in our diets over 40 per cent as we feel that this allows sufficient carbohydrate for all of the body requirements, and also allows enough variation in the diet so that it need not differ very much from that of a normal child.

One must also remember that he is treating the child as well as his diabetes, and that children treated early and carefully do the best. Their future health and happiness depend on the kind of treatment they receive during childhood. Everything possible should be done to aid these children to enter adulthood with as little handicap as possible.

THE EPIDEMIOLOGIC ASPECTS OF SYPHILIS CONTROL*

By W. A. BRUMFIELD, JR., M.D.
Albany, New York

Distinct changes are taking place in the attitudes of health officials and of the lay public toward syphilis and its control. Emphasis upon the facts concerning syphilis as an infectious disease, without reference to the moral side of the question, is resulting in a public demand for more information. The press, the radio, and other means heretofore unavailable can now be utilized to a great extent in bringing this subject to the foreground. At the same time definite changes are observed in the methods of attacking this problem. Indirect methods of control such as the suppression of prostitution and sex education are being replaced by direct methods based on sound epidemiologic principles.

Unfortunately, there are no wholly reliable figures from which the incidence or prevalence of syphilis in the United States can be determined accurately. With few exceptions, the records of health departments based on morbidity reports are very incomplete and inaccurate. Therefore, it has been necessary to resort to survey methods for estimating prevalence and in determining attack rates. Several types of surveys have been used such as: analyses of the results of routine serologic tests on hospital patients, including medical, surgical, obstetric, and pediatric groups; serologic surveys of population groups; serologic surveys of various occupational classes; and one-day morbidity surveys carried out by the confidential questionnaire method. Each of these methods is accompanied by a certain amount of unavoidable selection. It is to be expected that the rates among hospital patients, with exception of the obstetric groups, would be higher than in the general population, since syphilis itself is an important cause of illness. The results of serologic surveys depend upon the sensitivity and specificity of the test used. The value of information obtained by questionnaire methods is limited by the accuracy of the reports furnished by individual physicians and by the fact that they deal with a selected group composed only of patients under treatment. These limitations of survey methods, together with geographic, racial, sex, age, and social variations in prevalence, add to the complexity of the situation. I shall not discuss the detailed results of any of these methods. Suffice it to say that, taking cognizance of the inaccuracies which are known to exist, these surveys indicate that, from the standpoint of morbidity, syphilis is a disease of major importance.

The mere prevalence of syphilis, however, is not the only factor which makes it worthy of attention. This infection, frequently resulting in serious illness or death, directly or indirectly affects the entire population. Those suffering from syphilis are, of course, vitally concerned; those caring for members of their families who are incapacitated by it realize its seriousness; and the remainder of the people, although scarcely conscious of the existence of this infection are, nevertheless, paying millions of dollars in taxes annually for the care of persons in hospitals for the insane and other institutions because of it.

Available scientific knowledge concerning syphilis is sufficient for the formulation of sound programs for its control. The infective agent is known and its means of spread from person to person generally well understood. Laboratory methods are available by which the disease may be diagnosed at the earliest signs of infection, and in the majority of cases, any time thereafter, even during periods of apparently complete latency. In addition, it is known that infectiousness is limited primarily to early cases and that, with the passage of time, most patients become non-infectious even without treatment. Of greatest importance, however, is the knowledge that treatment of the early syphilitic will not only render him temporarily non-infectious in a few hours, or at most, days, but also if given over a sufficient length of time, will render him permanently non-infectious, in addition to protecting him against late manifestations of the disease in the event it does not effect a complete cure. The above facts indicate that the control of syphilis depends largely upon the prompt and adequate treatment of the early case, in the interests of the patient as well as of the public health.

The first step in the epidemiologic approach to this problem is to devise a method whereby complete and accurate reporting of all syphilis cases can be obtained. The establishment of a complete syphilis register is essential, in that it

---

*Read in Section on Public Health, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Division of Social Hygiene, New York State Department of Health.

is only through statistical analyses of such records that the prevalence of the infection may be ascertained, and that the results of control measures can be determined. The method should be as simple as possible, requiring a minimum amount of effort on the part of the reporting physician. Reports should include data concerning the age, sex, color, and marital state, the status of the infection, that is, whether congenital or acquired, early or late, the probable date of infection, and the time interval between the date of infection and beginning of treatment.

In developing this system, two facts must be remembered: first, that because of its moral implications, many physicians will not divulge the names of their patients; and second, that the disease is of great chronicity, which may result in duplicate reports from time to time. It is necessary, therefore, that provision be made so that physicians may report cases in such a way that the actual identities of patients will not be divulged, although sufficient information for the recognition of duplicate reports will be furnished.

For many years the New York State Department of Health accepted positive laboratory reports in lieu of case reports for syphilis. This method proved unsatisfactory. The enormous number of reports to be checked, many of which were identified by various symbols or numbers, made it impossible to remove all duplicates. This fact led to a change in the method of collecting morbidity reports. Since January 1, 1936, positive laboratory reports have not been acceptable as case reports for syphilis. Cases must be reported on a special card provided for that purpose. In view of the fact, however, that physicians do not wish to report by name, provisions have been made for reporting by initials and date of birth, a method proven satisfactory in the Scandinavian countries. In addition, these reports are collected only by health officials who have facilities for handling the material in such a way that the information will not be divulged to unauthorized persons. The practicing medical profession is assured that the confidential nature of these reports will be respected. It is believed that through the application of this method a satisfactory syphilis case register can be developed which in time will furnish accurate information as to the prevalence and trend of the disease in New York State.

Having devised methods for obtaining reports of cases of syphilis under treatment, the next step is to provide means for keeping these patients under observation until adequate treatment has been given. The number of patients is so large that the supervision of all cases cannot be accomplished. Fortunately, facts concerning syphilis indicate that this is unnecessary, and that efforts directed toward a relatively small group should result in a decline in the incidence of this disease. This brings up again the importance of obtaining information as to the stage of the disease, and date of infection on case reports. These reports may be utilized as the starting points for case investigations.

It has been shown that the great majority of infectious relapses in syphilis occur within the first two years succeeding the onset of the disease and that after five years such relapses are, indeed, rare. An exception is the transmission of the disease to the fetus during pregnancy, but here, also, the danger is less with the passage of time. It has been observed further that a minimum of twenty injections of a standard arsphenamine and a like number of the heavy metals, bismuth or mercury, will render the majority of patients permantly noninfectious. From these facts we are enabled to define "potentially infectious" cases, the treatment of which should be stressed. For administrative purposes the following classes of patients are considered "potentially infectious" in New York State:

(a) All untreated cases of syphilis, irrespective of the presence or absence of visible lesions if

(1) Of either sex, and the infection is of two years or less duration, regardless of the patient's age, and

(2) Females within the child-bearing age, regardless of a longer duration of infection, until the menopause has been reached;

(b) All treated cases, if in either of the above categories and given less than the equivalent of twenty injections each of an arsphenamine and of a heavy metal within a period of two years.

It is realized that this definition by no means covers all "potentially infectious" patients, but to increase the time interval, or to increase the treatment requirements would prohibit the complete supervision of cases. It will be noted that no distinction is made between congenital and acquired syphilis.

Lapses from antisyphilitic treatment are fre-

quent. This is not surprising when we consider that treatment very quickly relieves symptoms and removes all visible signs, and that many patients cannot understand the reasons for continuing further with more or less painful injections. Furthermore, a lack of interest on the part of the attending physician, his failure to inform the patients of the importance of adequate treatment, or too often, technical difficulties with intravenous or intramuscular injections are important contributing factors. These, together with the expense of treatment at the hands of private physicians, make it very difficult to keep patients under observation.

Attempts to prevent lapses from treatment should begin with the education of patients. A sympathetic physician in explaining what can be accomplished by adequate treatment, and pointing out the serious consequences which may result as a lack of it, can do more in keeping patients under observation than can be accomplished by costly and time-consuming investigations after delinquency has occurred. There are classes of patients, however, who will lapse in spite of all encouragement on the part of the medical attendant. Provisions should be made for the follow-up of these individuals.

Follow-up of delinquent patients is a responsibility which must be assumed by official public health agencies. This necessitates the employment of trained investigators whose services should be available to physicians for the follow-up of cases delinquent from private practice, as well as to clinics. These procedures must be tactfully performed without embarrassment to the patient involved. It should be understood that in the investigations of patients of private physicians, the investigator will act as a representative of the physician; will make every effort to return the patient to him and if this is impossible, will be guided by the physician's decision as to the final disposition of the case. It is only through such procedures that the cooperation of the practicing medical profession can be obtained, and without this cooperation, efforts to control syphilis will meet with failure.

It is not sufficient that activities should stop with the maintenance of treatment facilities for those who seek advice. Investigations of sources of infection and of contacts of syphilis cases constitute an additional step in the epidemiologic approach to syphilis control. As in the case of delinquent patient follow-up, efforts may be confined to the early and potentially infectious group. The procedures consist in ascertaining the names and addresses of the source of infection and contacts of each of these cases with the intent of placing them under antisyphilitic treatment if found infected and thereby rendering them non-infectious. There is reason to believe that the removal of infectious syphilitics from a population through the application of these methods will, through decreasing the risk of exposure, result in a decline in the number of new infections.

In many respects, contact determination in syphilis is a simple procedure. The nature of the contact is such that only a few persons would be suspected. Elaborate investigation is unnecessary. The patient in the clinic or physician's office can usually furnish the desired information. By tactful inquiry, the names of all contacts can be elicited. However, there are circumstances which make contact determination quite difficult or even impossible in some cases. Such cases are particularly common in cities in which the disease may have been the result of exposure to a "pick-up," or a prostitute whom the patient can neither name nor describe.

Munson's studies in New York State, and similar studies carried out at the University of Virginia, give every indication that investigations of sources of infection and contacts of syphilis patients are practical in more or less rural areas. Through the application of these measures a large percentage of these individuals can be identified and brought under observation. Information concerning the value of such investigations in cities is not sufficient to warrant definite conclusions. In Buffalo, New York, where follow-up procedures have been carried out on a city-wide basis for the past sixteen months, the results have not been as satisfactory as those obtained by Munson, and by Smith and his coworkers. However, the returns have been sufficiently encouraging to warrant the continuance of the method.

CONCLUSIONS

Scientific knowledge concerning syphilis indicates that its control depends largely upon the prompt and adequate treatment of the early case. Control procedures should include: facilities for obtaining complete and accurate case reporting; adequate treatment facilities; provision for the follow-up of delinquents until they are rendered permanently non-infectious; and provisions for the investigation of sources of

infection and contacts in order that they, too, may be given the benefits of medical advice.

DISCUSSION (*Abstract*)

Dr. Ferdinand O. Reinhard, Baltimore, Md.—Apparently a situation similar to the one in Baltimore exists in New York State in regard to the limitation of patients to be accepted for treatment.

During the year 1931-1932, in Baltimore, there was a marked increase in the number of cases requesting treatments. Treatments given increased from 57,000 to 84,000. As a result, it became impossible for the limited number of clinics and personnel to cope with this case load. The reasons for the increase were threefold: the inability of patients to pay private physicians, to attend pay dispensaries and to attend day clinics. The City Health Department clinics are the only clinics in Baltimore which are open at night and are entirely free.

As a result of these conditions, a group of leading syphilologists were asked to draw up regulations under which only those patients would be admitted who seemed to be most important from a public health standpoint. It was decided that the following groups were eligible:

(1) All primary and secondary cases.

(2) All cases of early latency. These were to include cases which gave a definite history of an early lesion within the preceding three years before being referred to the city clinic.

Where no history of initial lesion could be obtained, cases would be accepted under the following conditions:

(1) All women under 40 years of age.

(2) All men under 25 years of age.

One of the first results of these regulations was that it became necessary to admit all contacts irrespective of age, as a surprising number of sources given by early cases belonged to a group which was not eligible for treatment under the new system. It does not seem to be a safe procedure to rely too much upon the current belief that cases become practically non-infectious after a period of from three to five years. Some sources given had a history which went back more than five years and in some instances there was a history of inadequate previous treatment in the remote past. The cases admitted for treatment have been reduced from 5,950 in 1932 to 4,082 in 1935, and approximately 900 cases were refused treatment during the past year. If 12 per cent of these 900 cases finally enter insane asylums and 10 per cent become hospital charges due to cardiovascular disease, the ultimate loss to the city of Baltimore will be at least $24,000.00. This is based on a recent study which showed what Baltimore pays for the end results of untreated or insufficiently treated syphilitics.*

In view of these facts, it is felt that any regulations restricting the types of cases eligible for treatment should be viewed as emergency measures and it is hoped that just as soon as funds become available, patients will be accepted as formerly.

*Thompson, W. C.; Brumfield, W. A.; Caldwell, Lucille: The Direct Cost of Syphilis in a Representative American City, *American Journal of Syphilis, Gonorrhea and Venereal Diseases*, May, 1936, Vol. 20, No. 3, Page 243.

Dr. Brumfield (closing).—I wish to clear up a point regarding the application of our definition of "potentially infectious" syphilis cases. This definition applies only to the classification of patients for epidemiologic "follow-up" and has no connection with the eligibility of patients for treatment. Any syphilitic in upstate New York, regardless of the stage of the disease or duration of the infection, may obtain free treatment at a clinic if he is unable to pay for private medical care. In addition, antisyphilitic drugs are distributed free to physicians, without reference to the financial status of the patients to be treated.

It is realized that many persons who acquire syphilis can give no information as to the probable date of infection, and that our definition of "potentially infectious" syphilis cannot be applied in these cases. Each of these cases must be dealt with individually. In general, however, it may be said that all patients between the ages of fifteen and thirty years should be classed as "potentially infectious" unless proven otherwise. It is between these ages that most syphilis is acquired, and these persons, being in the years of greater promiscuity, are more apt to spread it.

THE NUMBER AND DISTRIBUTION OF PHYSICIANS IN THE SOUTHERN STATES AS BEARING UPON THE POLICIES OF SOUTHERN MEDICAL COLLEGES*

By O. W. HYMAN, PH.D.†
Memphis, Tennessee

Much publicity has been given to the alleged overcrowding of physicians in the United States. Most of this has emanated from the American Medical Association, and is based upon statistics for the United States as a whole. The fact that in 1929 there was a physician for every 797 people in this country, while other civilized countries showed ratios as high as 1 to 2,800, has been cited to show that we could have a great reduction in the number of doctors and still secure good, perhaps better, medical service. On the contrary, however, since 1929 more doctors have entered practice than have been lost so that in 1936 the ratio is 1 to 778. All this has led to the widespread belief that medical colleges should restrict their enrollments sharply and generally, and should accomplish this result by raising the requirements for admission and the standards of promotion and graduation.

We, who are here today, are concerned primarily with the conditions of medical practice

*Read in Section on Medical Education, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

†Dean, University of Tennessee College of Medicine, Memphis.

in the Southern states. Let us see to what extent these general statements are applicable to conditions in our territory. For the purposes of this discussion I include in the Southern area the states south of the Potomac and Ohio rivers, and Arkansas, Oklahoma, Louisiana, and Texas. If Maryland, Delaware and Missouri are included the results will not be modified materially.

In this region today the ratio of physicians to population is 1 to 1,106. In South Carolina there are 1,541 persons to every physician, in Alabama 1,361, and in North Carolina 1,346. These figures are all well beyond the ratio of 1 to 1,000 that has been urged often as the desideratum for this country. They are to be contrasted with ratios of 1 to 678 in the New England states, 651 in the Middle Atlantic states, and 582 in the Pacific states. Even the sparsely settled mountain states have a ratio of 1 to 791. We should keep in mind that, in discussing the Southern states, we are concerned with over 39,000,000 people, nearly one-third of the population of the United States. It is noteworthy that, while the proportion of doctors has been rising in other areas since 1929, every one of the Southern states shows a steady decline since as far back as 1916.

Now let us examine the distribution of physicians within the Southern area. Since I am familiar with conditions in Tennessee, I shall present these as probably typical. In 1936, Tennessee has 2,939 doctors, one for 1,004 people. Of these, 1,355 practice in the four cities. Of the remainder, 884 practice in towns and 700 in villages of less than a thousand people. In the cities there is a doctor for every 500 people. In the remainder of the state, there is a ratio of 1 to 1,517. Moreover, while in the cities 43 per cent of the physicians are over fifty years old, this percentage is 59 in the towns and 77 in the villages. Thus, while the proportion of doctors in Tennessee is almost exactly the commonly desired ideal, still there exists a wide discrepancy between the medical service available to the urban population and that to the rural. Moreover, in view of the age distribution this discrepancy threatens to become much worse in the immediate future.

We have before us a picture of certain areas in the United States so overcrowded with physicians that some are said to have been forced to taxi driving while others swell the relief rolls of the unemployed and an area in the South where there is widespread scarcity of doctors. This is an interesting phenomenon.

Much has been said about the evils of overcrowding in the medical profession, that it will lead to chicanery and slipshod methods, that the profession no longer will attract young men of superior ability, that the profession no longer will have the resources to finance its own advancement nor the incentive to seek improvements. These things are true and another evil result must be predicted. Doctors in such areas are likely to seek refuge in salaried work for the state or for lay organizations in such numbers as to become a major factor in realizing socialized medical service. While little has been written on the subject, the evil consequences of scarcity of doctors is likewise portentous. When a community has been accustomed to receiving prompt medical service and finds this service unobtainable or obtainable tardily and at great expense, public reaction is vigorous and prompt. In 1925, under such conditions, legislatures in Tennessee, Arkansas and Kentucky gave serious consideration to laws intended to produce more physicians in rural areas but actually striking a serious blow to the standards of medical practice in those states. Nearly every legislature in Tennessee since that time has, by special act, licensed someone to practice in rural areas who could not meet the regular legal requirements. There are certainly some men practicing medicine in our state without any license at all. In a certain rural community there are now practicing medicine a man who failed to pass the first year in medicine in two attempts, one who failed in dentistry, a pharmacist who never studied medicine at all, and two others who apparently have not any formal training. It seems that these men are protected from legal action on the part of the state board by local sentiment in their behalf. People will have some sort of medical service. It may be untrained or it may be from trained men employed with public funds.

Why do not the surplus doctors of other regions move into the South? There are no effective legal barriers. It is assumed frequently that graduates distribute themselves in proportion to the wealth of various regions. In a general way, this seems to be true. Surely, however, a man would not, for financial reasons alone, abandon his profession or rely upon governmental relief while he could move to another part of the country and be assured of an income equal to that of the well-to-do in his community. Financial pressure is an important

factor in controlling the distribution of physicians, but there are other factors equally compelling.

According to analyses that we have made at the University of Tennessee from time to time during the past twenty years, 68 to 72 per cent of our graduates who enter private practice return to their home communities. This has been a remarkably stable figure, little influenced by boom or depression.

When a physician contemplates entering practice in a community, he has much to consider. He wishes to be busy and he wishes to be well paid. I certainly would not belittle the influence of these factors. In addition to practicing medicine in a community, however, he expects to live there and he is concerned greatly as to whether he will like his neighbors and be liked by them. Will he be able to have a satisfactory home with satisfactory conveniences? Will he be able to use his spare time in recreations that appeal to him? Will his wife find agreeable associates and will his children find satisfactory opportunities to develop? I believe that the social factor is quite as important as the financial in influencing the distribution of physicians. This accounts for the return of most graduates to the areas from which they came. It also accounts for the failure of migration to correct a very faulty distribution.

While there is now a concentration of physicians in the northeastern, north central, and Pacific areas about twice as great as in the South, nevertheless medical colleges in these areas continue to graduate a new physician each year for every 22,000 people, while in the southern area the ratio is 1 to 41,000. Since graduates cling tenaciously to their home communities, the overcrowding in crowded regions is intensified annually. On the other hand, if every medical college now existing in the South continues to graduate physicians at its maximum capacity, the number of doctors in this region will still continue to decline for at least ten years, while the population continues to increase.

Under the serious threat of overcrowding in one area and the equally serious threat of scarcity in another, it is proposed that all medical colleges reduce their enrollment and do so by advancing requirements for admission and for promotion. To reduce enrollment by any method might alleviate overcrowding in the areas where it exists, but simultaneously it would accelerate and exaggerate the evils of paucity now existing or threatened in the Southern states.

To secure reduction of graduates by increasing the requirements for admission is open to serious question. The increase nearly always means an advance from the two-year requirement to three years and then four years. It can not be claimed that this produces better results in the medical college. As a matter of fact, all published studies that I have seen prove that the influence of the prolonged training upon the medical college record is negligible. Results are expected in medical practice. I share the belief that men with cultural training will become better doctors. However, two more years in college will not guarantee the acquisition of a cultured mind. One result of increasing the time required for premedical training is certain. It places added emphasis upon the financial resources of applicants instead of upon their intellectual resources.

It is not my purpose to make a plea for the "poor boy," but rather to point out effects upon the distribution of physicians. In wealthy areas colleges are more numerous and more easily accessible. There are more students able to pay the cost of prolonged college education. To increase the amount of premedical training therefore tends to increase the number of graduates in exactly those areas that are already overcrowded. Should we not then advance the requirements for admission by keeping the expense of the training down to a minimum and insiting upon the demonstration of superior ability, that is, high grades? Such a procedure does not increase the cost of premedical training.

The dilemma here presented has its roots in whether the college shall concern itself primarily with its responsibility to the general social program or with its ambition to achieve the highest degree of excellence in training its graduates. Certainly every college would like to do both. But if the two are antagonistic, then which shall control the policy? Most of the colleges in the Southern states are supported directly by the states in which they are located. Their prior obligation to the general program seems to me to be obvious. Even an endowed college, however, will ignore its public obligations with peril.

That the distribution of graduates may be affected substantially by medical college policies is demonstrated by our experience in Tennessee for the past ten years. In 1923 our State was experiencing an annual net loss of fifty physicians. Local migrations from village to town to city left the loss on rural communities. In 1925, an ill-considered attempt on the part

of the State Legislature to secure more physicians for these communities was barely aborted. Instead, the Legislature gave increased support to the University to finance its program to check the annual loss of physicians and to induce a better distribution.

The basic fact in the program was that 70 per cent of our graduates entering private practice return to their home communities. Obviously, young men in rural communities should be encouraged to prepare for practice. From 1925 to 1930 a campaign of publicity in each rural county served to call attention to the immediate and prospective needs of the county for more physicians. The ratio of students from rural counties responded at once and by 1927 the ratio of graduates going to practice in rural communities began to increase. Up to this time, sixty of our 1933 graduates have entered private practice. Forty-nine of these are in rural areas. The number of physicians in the State has been stationary since 1931. The distribution of physicians annually becomes more nearly satisfactory.

That these results have been achieved through the efforts of the University of Tennessee is evidenced by the fact that in 1920, 179 students from Tennessee were studying medicine, 42 in the University of Tennessee, 137 elsewhere. In 1930, the total had risen to 384, of whom 244 were in the University and 140 elsewhere, the entire increase being accounted for by the University's enrollment. These results have been achieved while entrance requirements were being raised steadily and substantially, and the standards of medical education greatly improved.

During the decade 1924 to 1933, 624 graduates of the University of Tennessee entered practice. Of these, 439, or 70 per cent, came to the college from rural communities. Three hundred sixty-two of these, or 83 per cent, returned to rural practice. Of the 195 who came to college from urban centers, 154, or 80 per cent, returned to urban practice.

On account of the tendency of graduates to return to their home communities to practice, I believe that applicants from areas in which there is a paucity of physicians should be given preference in admission, thus mitigating overcrowding in some areas as well as scarcity in others. I believe that the adoption of such a policy is in the public interest and in the interest of the medical profession.

In closing, let me recall that:

(1) There now exists a definite scarcity of physicians in the Southern states and this is increasing in the area as a whole.

(2) Within the area, the scarcity is found in rural regions.

(3) Scarcity of physicians, as well as overcrowding, entails grave consequences for the public and constitutes an ominous threat to the standards of medical practice.

(4) Increasing the cost of medical education stimulates more overcrowding in areas already crowded and produces a greater paucity in other areas; consequently standards should be advanced in ways that do not increase costs.

(5) Medical colleges in the Southern area should maintain the largest enrollment consistent with good standards and, since over two-thirds of medical graduates return to their home communities to practice, should favor in positive fashion applicants from rural areas of the Southern states

---

DISCUSSION (*Abstract*)

Dr. C. C. Bass, New Orleans, La.—Dean Hyman has presented convincing evidence of the uneven distribution of physicians in the country as a whole; the disadvantage affecting the population of the Southern States, and especially those living in rural areas in this region. He has also shown, through their experience in Tennessee, how this uneven distribution of physicians between urban and rural communities can be corrected, to a large extent, by encouraging and promoting the study of medicine by young men from the rural sections where physicians are most needed.

The continually increasing cost of medical education has kept out of the medical profession a larger and larger number of the most desirable men, from the standpoint of loftiness of purpose, ideals and, in fact, ability to learn medicine. On the other hand, it still leaves wide open the door for those who can meet the cost easily but who possess, in much less measure, those other qualifications that are more needful for useful service in medical practice. The greater cost of a medical education falls more heavily upon potential medical students from rural communities, where there is the greatest scarcity of physicians, than upon those from cities, where overcrowding already is supposed to exist.

Therefore, those who are interested in increasing the number of physicians in rural communities will do well to promote, in whatever way they can, medical education of students from rural districts. Medical schools that have more applicants than they can take could consider giving preference, all other things being equal, to a larger proportion from the parts of the country where there is the greatest scarcity of physicians.

But there is another cause for the unequal distribution, and that is a fault of medical education itself. Most medical schools have on their faculties very few

teachers who have had actual experience in medical practice under circumstances under which their graduates will have to practice if they go where they are most needed. The students' training is largely in the hands of teachers unfamiliar with the practical problems he will meet. Unfortunately the internship does not bridge the gap. When the student finishes he hesitates to undertake a general practice anywhere except where he can have access to facilities upon which he has been taught to be dependent, when he should have learned more how to use such facilities and methods as will be accessible to him. Teachers in medical schools should keep constantly in mind the job their students will have to do and the facilities that will be at their command.

Dr. W. T. Sanger, Richmond, Va.—Obviously, it is difficult to apply any single formula such as reducing the size of medical classes because of the surplus of men already in practice through the country as a whole; conditions vary with the several large sections of the nation. With twice as many physicians in practice in the North in proportion to the population as in the South, and likewise with twice as many graduates there in proportion to the population as in the South, the problem of supply and demand, and the size of medical classes, in the North as contrasted with the South, cannot be settled on the basis of a single prescription. Every section, in fact the constituency of every medical school, must be given specific study before any conclusions can be drawn with assurance.

In 1924, the General Education Board of New York issued an important publication on the distribution of physicians in the United States, by Mayers and Harrison. In a word this showed that the distribution rather than the number of physicians was the important consideration involved in giving our whole population proper medical service. The shortage of physicians in the rural areas was shown to involve many factors, among them that some of the old maladies, such as typhoid and malaria, had virtually disappeared, thus reducing the number of practitioners once required; that the old side lines of medical practice such as farming, storekeeping, mill operation, *et cetera,* were no longer favorably or advantageously considered; that the automobile, while it made it easy for the physician to get to his patient, also made it easy for the patient to go to the larger centers of population for types of medical service, thus taking the better pay cases from the rural practitioner, leaving him the leaner aspects of practice; that other handicaps obtained in the country sections such as sub-standard churches, schools, social opportunities for the family and lack of professional contacts, and hospital facilities. This study also pointed out some compensating factors on the other side. At any rate, the difficulty of providing medical service to the country districts was amply shown, as confirmed today by Dr. Hyman's figures.

It is stated that 70 per cent of the graduates of the University of Tennessee go home to practice. This is not true of the graduates of our institution, as evidenced by only partial figures on the subject. Certainly, further study should be made on this point. In addition to the home as a factor in attracting graduates for practice we have noted that the availability of hospitals and the location of the hospital in which the internship is taken are quite weighty factors in determining location for practice. It seems that a good many during the internship make professional friendships and consequent arrangements for practice in the area of the hospital in which the internship is served.

While generally averse to seeing the costs of medical education increased, most of us at our institution are, I think, convinced that three years of preparation is considerably better than two years of preparation for medicine. At least several careful studies as already made tend to confirm this conclusion.

Of late we have heard a great deal about the regimentation of the social order. Business in particular has complained. If someone were to write the story of regimentation in education the regimentation of business would be completely eclipsed. The medical schools of any region cannot meet their responsibilities, it seems to me, unless their program in all of its aspects is based upon accurate studies of the needs of the territory primarily served. Such studies must be continuous and cumulative and should perennially affect both the number of students and the curriculum offered.

MANAGEMENT OF PSYCHONEUROTIC PATIENTS*

By LEWELLYS F. BARKER, M.D.
Baltimore, Maryland

To deal at all adequately with so large a subject in so brief a period of time as that allotted to me will require close concentration upon the more important features and ruthless elimination of less pertinent materials. Patients presenting psychoneurotic syndromes are always with us: the neurasthenics with their irritable weakness, their pathological fatigability, their abnormal sensitiveness, their headaches, dizziness, insomnia, and other symptoms; the hysterics with their functional paralyses, anesthesias, aphonias, or convulsive seizures; the hypochondriacals with their innumerable complaints referred to region after region of the body despite negative findings on careful physical and laboratory examinations and with their convictions often characteristic of the "chronic invalid reaction" that physicians are unable to make a correct diagnosis; the psychasthenics with their phobias, obsessions, scruples, compulsions, rituals, feelings of unreality, states of indecision, and over-conscientiousness; the victims of the anxiety neuroses with their continuous states of over-anxiety, with the occurrence of feelings of oppression and sometimes of impending death,

*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

and with their vasomotor and secretory anomalies; and the neurotics who attribute their symptoms to preceding trauma though the symptoms seem in reality to be due to so-called "epithymetic reactions" dependent upon semiconscious wishes to be sick, or to appear to be sick, for the sake of securing advantages, states often observable among those who carry "accident insurance" or "sickness insurance," or among those for whom the Veterans' Bureau is responsible, and which require most careful study to distinguish them from residuals of actual organic injury, on the one hand, and from fully conscious and definitely planned simulation on the other.

In all of these psychoneurotic states we see evidences of the inability of certain human personalities to achieve harmony within themselves, to become adequately adjusted to their surroundings; as Adolf Meyer has well put it, they are examples of faulty psychobiological integration resulting in characteristic peculiarities of attitude and behavior. The defects lie, as a rule, in the domain of emotion and will rather than in the domain of intellect. Just what type of psychoneurosis will appear in a given person will depend upon his inherited makeup (genotype), on the one hand, and the particular environmental stresses to which he has been exposed, on the other. Studies of physical habitus (pyknic, asthenic, dysplastic) and studies of temperament (extrovert or introvert, cycloid, schizoid), will often throw light upon the nature and origin of the psychoneurotic states encountered.

Though the existence of one or another of the above-mentioned functional nervous states is now-a-days easily determined by the well-trained practitioner, this recognition is only the beginning of the diagnostic task of the physician who desires successfully to treat his patient. For it is not only necessary to ascertain the particular features of the psychoneurosis that exists and to explore the relations of these to hereditary make-up, on the one hand, and to special environmental influences, on the other, but it is also very important to make a general diagnostic survey of each patient by means of careful physical examinations, x-ray examinations and laboratory tests that will reveal any abnormalities of structure or function of the respiratory system, the circulatory system, the blood and hemopoietic organs, the digestive system, the urogenital system, the locomotor system, the central and peripheral nervous system, the organs of special sense, and the endocrine glands and other organs concerned in the metabolism of the body. Only after such a general diagnostic survey has been made can one arrive at a complete multi-dimensional diagnosis that will permit one to estimate the relative importance of the psychoneurotic state and of the other abnormalities that accompany it. In the planning of the treatment of the patient, too, one must follow a similar comprehensive method, for attention to the psychoneurosis alone will often result in failure through disregard of accompanying disorders that require definite therapeutic intervention. Infected tonsils or teeth, high blood pressure, an allergic asthma, a secondary anemia, hyperacidity or anacidity of the stomach juice, a spastic colon, a chronic appendix, gallstones, an arthritis, a pyelitis, a refraction error, an endocrinopathy, a profound under-nutrition, an extreme obesity, or a vitamin deficiency, for example, if found to be present should of course receive appropriate attention. The therapeutic measures employed should be sufficiently comprehensive and wisdom should be shown in the making of decisions as to the order of application of these measures. The modern neurologist is aware of this and when treating his nervous patients calls to his aid, in case of need, an internist, a surgeon, or a practitioner in one or another special domain, a practice that was formerly too often neglected to the detriment of the patient, on the one hand, and to the disappointment of the neurotherapeutist on the other. Group methods of diagnosis and therapy are becoming ever more popular and rightly so, for reasons that should be sufficiently obvious from what I have just said. But to practice by this method does not necessarily entail membership in any special organized group, for the individual practitioner can refer patients for reports to as few or as many of his colleagues in the community as he may think desirable in the individual case, making use of one set of consultants for one patient and perhaps a quite different set for another. And this can be done without too great cost to the patients since when the ordinary charges are found to be incompatible with the means of the patients, arrangements can easily be made to reduce pro rata the fees paid to the individuals who participate in the study and treatment so that there will be no hardship.

When deciding where a patient exhibiting a psychoneurotic syndrome shall be treated, much will depend upon the severity of the symptoms. In milder cases, patients may often be treated satisfactorily at their own homes, or by physicians in their offices, provided the cooperation of their families can be secured, and provided, of course, that the physicians in charge are suited by nature, temperament and experience to handle them. In extremely severe cases, transfer to special psychiatric institutes for a period may be necessary. In cases of moderate severity, too pronounced to be satisfactorily treated at home, but not so grave as to require internment in a psychiatric clinic, the treatment is best carried out in a well organized general hospital or in a comfortable and well conducted nursing home, with a good special nurse with the patient during the day.

It is desirable to gain the consent of the patient and family to isolation for a period at the beginning of the treatment; no letters or visits are received during this period, it being made clear, however, that if anything really important should go wrong with family or friends the patient will be promptly informed; hearing nothing, the patient can be assured that everything is all right at home. At the same time, too, the physician, or the nurse in charge, will keep the family regularly informed of the patient's condition and progress. Only in this way can the environment be rigidly controlled in the early stages of treatment of a psychoneurotic patient, a measure that Weir Mitchell and others taught us as very important if treatment is to be successful.

In the early part of the treatment, too, complete rest in bed is usually desirable for four or five weeks, though the duration of the rest may vary in different cases according to the severity of the symptoms, the state of the nutrition, and the response made to therapy.

The diet during the first few days should consist entirely of milk given in small quantities every two hours in the daytime (Dubois; Karrell), after which three good meals may be given daily, and in emaciated patients extra milk and raw eggs after meals may be added. When the appetite is poor, the injection of 10 or 15 units of insulin twenty minutes before each of two or three meals daily may be useful. The rest in bed, the isolation, and the preliminary milk diet are together very helpful in establishing the strict medical obedience of patients who had grown accustomed to dominating their environment. The physician in charge should be kind and sympathetic but should insist firmly upon strict and systematic applications of the measures that he believes to be essential for the patient's welfare.

As to the use of medicines, the physician must use his best judgment. Many psychoneurotics have been taking drugs to excess, often bromides or chloral, even to the degree of actual intoxication. Insulin is very valuable for increasing appetite, better I think than the cacodylate of soda formerly used. For great irritability and for insomnia mild sedatives may be used temporarily, especially barbital or phenobarbital in small divided doses, but the patient should be weaned from these as early as is feasible. Constipation should be overcome; often regularity of habit can be restored by the use of mineral oil or of psyllium seeds, though in spastic constipation an atropin derivative may be needed.

Some use may be made of hydrotherapy. For insomnia a tepid bath at bedtime or a wet pack may be helpful. Later, stimulation of the skin by carbon dioxide baths may be useful for sluggish neuropaths. Massage may be given thrice weekly.

After improvement has set in, occupation therapy becomes advantageous, especially if it can be well supervised. Drawing, modelling, cross-word puzzles, needlework, wood carving, weaving, book-binding, leather tooling, and so on, will often excite interest in things outside the patient, especially desirable in the pathologically egocentric. Walks and drives with the nurse in the open air may be permitted in due time, and later occasional visits to the theater, to concerts or to the movies.

But most important of all in the treatment of a psychoneurotic is the systematic and judicious use of psychotherapy by the physician and the nurse in attendance. Enough time should be spent with the patient to become well acquainted, to listen patiently to complaints and to gain the confidence of the sufferer. Gradually, the patient is encouraged to reveal frankly any earlier emotional conflicts that may have been suppressed. Familial and other relationships are freely discussed and the sources of anxieties and fears are carefully sought for. Through explanation, reassurance, persuasion,

and re-education, the patient, tactful physician can be very useful in helping psychoneurotic patients out of their difficulties. As improvement takes place, activities are guided until the restitution has been sufficient to permit of a return to life and work at home. But the physician who does not understand that psychoneurotic states are in reality pathological states and who abruptly tells those suffering from them that there is nothing wrong with them and that they should return to home and work at once will do more harm than good. If he lacks interest in and understanding of these states or has not the necessary time to give to them, he should refer such patients to neurologists who will treat them by methods that have been found to succeed.

ANURIA OF THIRTEEN DAYS*

CASE REPORT

By RUDOLPH BELL, M.D.
Thomasville, Georgia

In the following case report, the patient walked into the hospital after eleven days of anuria. He showed no appreciable nitrogen retention in his blood, urinalysis was negative after secretion of urine was resumed, and he made an uneventful recovery.

Case 17369.—J. W. D., a white man 55 years of age, an old trouper of Barnum & Bailey's circus, who has resided in this territory for the past eighteen years and is now a musician by profession, was admitted to the John D. Archbold Memorial Hospital February 6, 1935, because of swelling of the entire body, chiefly lower extremities and scrotum, and some dyspnea on exertion. Friday, January 25, 1935, eleven days before, he reported to be the last time that he had passed any urine. The nights of January 24 and 25 were the coldest recorded in this section of the country for several years. The patient had been sleeping in the upper story of an old store and had only one blanket for cover. On the morning of January 26 he had a desire to void as usual, but no urine could be passed. He had no other desire to urinate that day; he attempted to pass urine several times afterwards, but to no avail. On Sunday, January 27, he noticed that his left ankle was swollen. It became progressively worse, swelling started in the other leg, and this edema became so massive that it hindered his walking. On Saturday, February 2, 1935, seven days after onset, the scrotum began to swell. This progressed rapidly and by Monday there was a generalized edema. Until Monday, February 4, 1936, ten days after the onset of anuria, there were no symptoms other than the edema. On Monday dyspnea upon exertion was noticed. This became worse until Tuesday afternoon, when he was persuaded by friends to see a druggist, who gave him a bottle of "kidney pills." He took two and the following day was admitted to the hospital.

His last illness dated back to 1917 and was described as ptomaine poisoning. Thirty-three years before he was struck on the penis with a baseball bat, following which he had a good deal of swelling of the penis, and since then he had not been able to retract the foreskin. The family history was irrelevant; his habits were good. He had never had any difficulty in urinating until the present illness.

He was extremely edematous and weighed 209 pounds. His age was 55 years, he was walking, slightly dyspneic, mentally alert and answered questions precisely. The body and extremities were water-logged, the lower extremities more so than other portions of the body. The skin was tight and seemed ready to burst; there were no sores. The face was puffy and edematous, but because of the extreme degree of edema of the remainder of the body it was not very noticeable. There was a moderate edema over the chest which impaired percussion somewhat, but coarse moist rales could be heard at the bases. The heart was normal, blood pressure 165 over 110, there was no tenderness nor rigidity of the abdomen, and there were no palpable masses. Percussion indicated that the bladder was empty. The reflexes were normal.

The penis was three to four times the usual size, due to edema; the prepuce was inverted and adhered to the glands; the scrotum was distended and held from one and one-half to two quarts of fluid. The skin was normal.

There were no hemorrhoidal tags; the sphincter was of good tone, the prostate usual in size and consistency, the seminal vesicles not palpable.

The medical consultant, Dr. Ernest F. Wahl, reported: the patient gives a history of slight shortness of breath and generalized swelling of the entire body of a few days' duration. The past history is irrelevant. Repeated questioning fails to bring out any allergic family history.

Physical examination confirms in all respects the findings noted above. History and physical findings suggest a renal lesion.

Laboratory examination February 7 showed the blood nonprotein nitrogen to be 35 mg. per 100 c. c., chloride 620 mg. and creatinine 1.7 mg. The blood chemical figures were checked several times by Dr. Mary J. Erickson, pathologist. The Kahn test was negative.

February 8, 1935, two days after entering the hospital, the patient began voiding and passed 1,000 c. c. of urine in 24 hours. Analysis showed a clear acid urine, specific gravity 1.025, no albumin, sugar nor casts, a few epithelial cells, no pus, red blood cells nor bacteria. The blood nonprotein nitrogen was 35 mg., white blood cells were 6,500, red blood cells 3,540,000, hemoglobin 61 per cent (Dare), polymorphonuclears 75, eosinophils 1, lymphocytes 24, and there were no malarial parasites. For a few days after normal micturition became established the urinary output was much higher than the total fluid intake, and the edema rapidly subsided.

On February 15, 1935, the urethral orifice was not

*Received for publication March 9, 1936.

large enough to admit a No. 12 F. sound. Under caudal anesthesia circumcision and meatotomy was performed. A No. 24 B. B. cystoscope was passed through a tight urethra with some difficulty, due to stricture which made inspection of the bladder unsatisfactory. The bladder walls were somewhat trabeculated and the left ureteral orifice was reddened and small. No other abnormality was found in the bladder. A No. 6 F. catheter passed to the left and a No. 7 to the right kidney pelves without difficulty. No urine flowed from the right side. It was ascertained afterwards that the catheter was obstructed. A specimen was collected from the left side. One c. c. of phenolsulphonephthalein injected intravenously appeared on the left side in seven minutes. The dye was collected for ten minutes and read 1 per cent. A bilateral retrograde pyelogram was done, which revealed no gross pathologic condition. The urine collected from the left kidney was cloudy, contained no casts, had an occasional pus cell, blood cells 1 plus, and urea 6 grams per liter.

On February 16, 1935, ten days after admission, the edema had disappeared so that the patient was restored to his normal weight of about 147½ pounds. He was 61½ pounds lighter than on admission. His white blood count was 7,800, red count 3,500,000, hemoglobin 68 per cent (Dare), polymorphonuclears were 60, transitionals 2, lymphocytes 32. The sedimentation rate, first fifteen minutes 2 mm., forty-five minutes 4 mm., sixty minutes 5 mm. He was permitted to go home with instructions to return for further observation.

April 4, 1935, two months after his illness, the patient returned to the hospital for a check-up on the pyelogram. No abnormality was found in the retrograde pyelogram at this time. His blood pressure was 130 over 90, and urine normal.

On October 23, 1935, about eighteen months after his illness, the patient's general condition was good. His blood pressure was 140 over 85; weight 150 pounds, and urinalysis was negative.

November 5, 1935, an excretion pyelogram was made following an intravenous injection of an opaque medium. The medium was rather slowly excreted by both kidneys. There was no evidence of hydronephrosis or of ureteral abnormality.

CONCLUSION

The patient had a well compensating heart throughout his illness. He lost sixty-one pounds in ten days after urinary secretion was re-established.

The etiological factors which might be considered here are: exposure to cold, a small urethral meatus and the phimosis. It may be that the exposure to cold lowered the blood pressure to such an extent that anuria developed. Randall* says, in regard to blood supply to the kidneys, that a certain pressure in the afferent renal vessels (60 mm. of mercury) is essential for urinary secretion to take place and that lower figures are accompanied by anuria. The phimosis was perhaps the causative factor of anuria in this particular case, as I have observed in the literature a number of case reports of anuria in which a meatotomy had to be performed before a cystoscope could be introduced, but no mention has been made of phimosis as an etiological factor in anuria.

I wish to express my appreciation to Dr. H. E. McTyre for the valuable services rendered me at the time this patient was being treated.

*Randall, J.: Jour. Urol., **13**:257, 1925.

OBSTRUCTION OF THE SMALL INTESTINE BY ENTEROLITH: RECOVERY FOLLOWING REMOVAL*

By FRANCIS J. SCULLY, M.D.
and
JACK S. STELL, M.D.
Hot Springs National Park, Arkansas

Primary calculi of the small bowel are sufficiently rare to be interesting. Edwards,[1] in 1930, reviewed the literature and found fifteen cases of various types of enteroliths causing obstruction, in addition to the case he observed. His patient was a woman, 72 years of age, from whom he removed a large stone near the ileocecal valve. Blix,[2] in 1935, reported a case of a woman, 80 years of age, from whose ileum a large stone was removed. Ho Dac Di,[3] in 1935, also reported a case in a woman, 40 years of age, in which a stone the size of a small orange was removed at operation. At autopsy two days later there were no pathological findings to account for the stone. The mortality in these cases is very high, and the following case is interesting because of the exceptionally good recovery following the removal of the stone.

Mrs. J. R., a woman 67 years of age, was seen January 10, 1936. Five days previously she had developed cramping in the abdomen and had had several loose bowel movements. The cramping continued and became quite severe, but there had been no further movement of the bowels. Enemas had been given with no results. Two days previously she had developed vomiting, which had continued. The vomitus was bile stained. She was given a purgative and also several high enemas without results. On January 11 the vomitus developed a fecal color and the abdomen became more distended.

No mass could be felt in the abdomen. The point of most marked tenderness was in the right lower quad-

*Received for publication September 14, 1936.

rant. There was no visible peristalsis, but on auscultation a gurgling could be heard, indicating an active peristalsis. The temperature was 98.4°, pulse 114, blood pressure 160/75. A blood count showed 85 per cent hemoglobin, 4,300,000 red cells and 9,000 white cells. A urine specimen showed a trace of albumin, specific gravity 1.018, and was otherwise negative. An x-ray of the abdomen showed the small intestine distended with gas, with a ladder-like marking. There was no gas in the large bowel. The findings were considered diagnostic of a small obstruction, probably in the region of the terminal ileum. No shadow of a stone was noted.

On the afternoon of January 11, under spinal anesthesia, Dr. Stell removed a large egg-shaped stone from the ileum, six inches above the ileocecal valve. The patient made an uneventful recovery.

The stone measured 10.1 x 1.6 cm. and weighed 11.21 gms. A chemical analysis was made by Dr. W. F. Manglesdorf, State Chemist, who reported:

Nitrogen	4.35
Casein	72.50
Silicon oxide	.08
Calcium oxide	1.02
Magnesium oxide	.06
Phosphorus	.32
Sodium chloride	0.1

Bile salts, trace in outer zone.

Subsequent examination of the patient did not show where the stone might have originated. There was a history of typhoid at 17 years of age, and three attacks of gallstones within the previous four years. One attack was accompanied by jaundice. From the appearance of the stone it is possible that it was pocketed in a diverticulum in the small bowel. One end was much darker colored as though it had projected into the lumen of the bowel, and had only recently been forced out into the bowel, causing the obstruction.

In our review of the literature no report of a casein stone was found. Three types of enteroliths in the small bowel have been reported: those most frequently reported consisted mainly of calcium phosphate and calcium carbonate; second, those consisting of choleic acid; third, hard stones of calcium oxalate, which were rarely found. Since the analysis did not show cholesterin, and only a trace of bile salts, the intestinal origin from the caseins of ingested food seems more likely than its formation in the biliary tract.

REFERENCES

1. Edwards, G. H.: Enteroliths of the Small Intestine. Jour. Fla. Med. Assn., **17**:463-466, 1930.
2. Blix, G.: A Contribution to the Chemistry of the Primary Calculi of the Small Intestine. Acta. Clin. Scandi., **76**: 24-34, 1935.
3. Ho Dac Di: Occlusion de l'intestin grele par un calcul non biliare de nature oxalo-phosphatique enterolith. Bull. et mem. Soc. nat. de chir., **61**:832-835 (June 29) 1935.

THE CHEMICAL TRANSMISSION OF NERVE IMPULSES IN THE AUTONOMIC NERVOUS SYSTEM*

By EUGENE L. JACKSON, PH.C., B.S.
Emory University, Georgia

[This paper summarizes the work for which Sir Henry H. Dale, of London, England, and Professor Otto Loewi, of Graz, Austria, were awarded jointly the Nobel Prize in medicine and physiology for 1936.—EDITOR.]

The autonomic nervous system, as Langley proposed that collection of efferent nerves supplying smooth and cardiac muscle and gland cells be called, as a physiological entity has attracted attention for many years. Very numerous have been the researches which have contributed to our present state of understanding of its finer anatomy and general physiology. We are concerned in this discussion, however, only with those studies which have elucidated the problem of the mechanism of transmission of nerve impulses from their origin in the central axis to the responding peripheral cells. An adequate picture of this cannot be traced without briefly reviewing those early researches, which, in retrospect, seem to have played an important part in the final solution of this problem.

Development of the Conception of Chemical Transmission.—The conception that impulses in the autonomic nervous system might be transmitted peripherally by the mediation of a chemical substance seems to have been stated first by T. R. Elliott in 1904. He had shown the now familiar correspondence between the actions of epinephrine and those of the sympathetic nerves. When certain of these nerves were cut and allowed to degenerate, he found that epinephrine still caused the characteristic response. Obviously, the drug could not have been affecting any structure depending on the peripheral nerves, so he was led to state that epinephrine "might then be the chemical stimulant liberated on each occasion when the impulse arrives at the periphery." Unfortunately he made no attempt to establish the truth of this prophetic speculation.

*Received for publication December 19, 1936.

*From the Department of Pharmacology, Emory University School of Medicine, Emory University, Georgia.

Elliott's work impressed the late Walter E. Dixon, who avidly embraced and extended this novel idea, having the conception that not only nerve but drug stimulation produced its effects indirectly by liberating peripherally a natural hormone. He attempted an experimental proof of his concepts, but his results were not very convincing, and later on he lost interest. However, as the result of his researches he wrote:

"There is no inherent difference between the action of muscarine on the one hand and electrical stimulation of the vagus on the other. So similar are the effects that it is not unwarrantable in the absence of evidence to the contrary to assume that they are brought about in the same way. If it is possible to argue from analogy, there is reason in the suggestion that excitation of a nerve induces the local liberation of a hormone which causes specific activity by combination with some constituent of the end organ, muscle or gland."

At the 1906 meeting in Toronto of the British Medical Association, Reid Hunt presented the results of his studies on the physiological activity of choline and certain of its esters. He was much impressed with the activity of the acetyl ester of choline, for he had shown that it was about one hundred thousand times as active as the mother substance, and that its activity very closely approximated that of parasympathetic stimulation. He speculated on the possibility that such a substance might occur in the body, for it seemed well fitted to subserve some function, but he found no evidence for it. Dixon presented his ideas at this same meeting, and here was the answer to his problem, but it is evident that the two workers, if they knew of each other's researches, did not then recognize the significant relationship.

The next important advance came in 1914, when Dale[1 2 3] and Ewins discovered the presence of acetylcholine in some extracts of ergot which they were studying pharmacologically, for until then acetylcholine was not known to be a constituent of any living cells. A thorough study was then made of the compound's action, and it was established that in low concentration it produced with remarkable conformity the peripheral effects of stimulation of parasympathetic nerves. Dale called this its "muscarine" action, and showed that all these effects were readily antagonized by atropine. In somewhat higher concentrations it produced a different series of effects, and these were shown to result from the stimulation of all autonomic ganglia. This he called its "nicotine" action. The action of the drug was exceedingly prompt, very intense and surprisingly fleeting. The results of these studies led Dale, also, to suggest that acetylcholine was a substance peculiarly well fitted to play the role of a parasympathetic hormone: if only there was some reason to suppose that it occurred in the animal body.

Proof of the Conception of Chemical Transmission.—Professor Otto Loewi, of Graz, Austria, pondering upon the problem of nerve impulse transmission peripherally had the idea that if the vagus nerves inhibit the heart by the liberation of a muscarine-like substance (Dixon), the substance might diffuse out into saline solution left in contact with the heart while it was subjected to vagal impulses and inhibition. The presence of the substance in the saline would then be demonstrated if, when applied to a normal heart, it inhibited it. He immediately put to test his idea and found it to be a fact, and further, that when the accelerator fibers were stimulated, a substance was released into the saline which in turn would cause the test heart to accelerate. The substance which was mediating vagus impulses, Loewi called "vagusstoff." Here, then, was the proof, and the first clear experimental evidence, of the peripheral release, during nerve stimulation, of a chemical substance transmitting the characteristic effects of nerve impulses.

Extension and Amplification of the Conception of Chemical Transmission.—There now appeared in rapid succession a series of reports from the laboratories at Graz and elsewhere which amplified and extended Loewi's original observation.[5 6] The vagus stuff was shown to be an ester of choline, probably acetylcholine, but there was rightfully a reluctance to assume this, for acetylcholine had not, as yet, been proven to occur in the animal body. In 1929 Dale and Dudley proved the presence of this substance in extracts of the spleen of the horse and ox, so the identity of vagus stuff and acetylcholine was rendered much more reasonable. Absolute proof of their identity is still lacking, and probably will continue so, but various tests show the exact paralleling of their actions, so we are sufficiently conservative in calling vagus stuff acetylcholine. Workers in Loewi's and in Dale's laboratories demonstrated the presence of an esterase in mammalian blood which rapidly

destroyed the hormone of acetylcholine, and it was also shown that physostigmine inhibited the activity of this esterase. Atropine antagonized the action of the hormone, acetylcholine, not by preventing its release, but by preventing it from acting on the responsive cell.

The truth of Loewi's work was amply confirmed by Hamburger and others, but all workers had obtained the active substance by perfusing the heart with saline. Demoor raised an objection to the method, pointing out that irrigations with a salt solution are unphysiological and might create abnormal conditions in the tissues. This objection was soon invalidated, for Feldberg and Krayer showed that if the esterase activity of the blood of a dog or cat be inhibited by physostigmine, acetylcholine appeared in the blood of the coronary vein after electrical stimulation of the vagus caused cardiac inhibition.

Parasympathetic Division. — Evidence now rapidly accumulated to show that stimulation of parasympathetic nerves other than the cardiac vagus also released acetylcholine as the chemical mediator of their impulses. Englehart very ingeniously demonstrated that the parasympathetic nerve impulses to the intrinsic muscles of the eye were mediated by acetylcholine. von Beznak, Babkin, Henderson, Feldberg and Secker all presented evidence proving that stimulation of parasympathetic fibers which travel in the chorda tympani results in the release of acetylcholine, which in turn activates the salivary glands. The researches which lent strong support to the belief that the nerve impulses in parasympathetic and enteric nerves regulating intestinal activity were mediated by acetylcholine are too numerous to review at this time. Quite definite proof of the truth of this view was given by the work of Feldberg and Rosenfeld, and Domomae who showed that in esterinized monkeys and cats acetylcholine appeared in the blood of the portal vein. That the impulses in the thoracic vagus nerve are transmitted to the stomach by acetylcholine was also demonstrated by Dale and Feldberg. Henderson and Roepke have presented experimental evidence indicating that the parasympathetic nerve fibers which control the tonus mechanism of the urinary bladder do so through the liberation of acetylcholine. Recently Thornton reported that in the isolated perfused lung, stimulation of the cervical vagus leads to the release of acetylcholine.

Although the entire distribution of parasympathetic nerves has not as yet been investigated, there is little reason to question the fact that all of these nerve fibers have their impulses transmitted peripherally by the release of acetylcholine. Dale suggested that words are needed which indicate the function of nerve fibers as regards the chemical transmission of their activity, and he proposed the use of the adjectives "cholinergic" to identify those releasing acetylcholine, which have just been considered, and "adrenergic" to identify those which have their impulses mediated by the release of an epinephrine-like substance. The latter group will now be considered.

Sympathetic Division.—The chemical mediation of sympathetic nerve impulses was, as stated, first conceived by Elliott, but it was proven by the classical experiment of Loewi. The truth of Loewi's discovery was soon well confirmed independently by Van Dam, Lanz and Kulz, who extended the original observations, showing that the substance freed in the heart by stimulation of the accelerator nerves, exerted a typical epinephrine effect, inhibition, upon gastric peristalsis. Finkelman demonstrated a similar substance in the intestine following stimulation of the sympathtic nerves. None of these workers, however, proved the identity of the chemical mediator, although their results gave strong support to Elliott's original conception. The proof of the identity of the chemical mediator, as well as the firm establishment of the truth of the conception, came largely as a result of the researches of Cannon and his associates at Harvard University.

The Harvard group was able, without disturbing otherwise the normal state of the organism, surgically to separate completely the heart of a cat from its central nervous system. The denervated heart was an extremely sensitive indicator of even minute changes in the concentration of epinephrine in the circulating blood. Any stimulus which would call into activity the sympathetic nervous system, such as struggling, asphyxia or pain, resulted within a few seconds in a marked acceleration of the pulse rate, one hundred or more beats per minute. After inactivation of the adrenals a stimulus did not cause the prompt marked acceleration, but now there occurred a slow, moderate increase of twenty to thirty beats per minute, which developed gradu-

ally to a maximum in about three minutes and then slowly returned to the normal. The phenomenon must have been due to some change in the circulating blood, since that was the only functional connection between the heart and the rest of the body. Turning their attention to this very interesting phenomenon, Cannon and his associates found that if all parts of the sympathetic nervous system, except short ganglionated strands in the lower thorax, were surgically disconnected from the spinal cord, a proper stimulus caused the characteristic delayed acceleration of the pulse, but the acceleration did not occur if the thoracic strands were also excised. They reasoned from this that it was quite improbable that these remnants of sympathetic ganglia in the lower thorax distributed fibers to the heart or the liver. It was more probable that when these fibers discharged impulses into the skin region there was produced a substance which, entering the circulating blood, affected the heart. Cannon and Bacq put this idea to test. Cats were prepared with denervated hearts, with adrenals and liver excluded from action, and the spinal cord sectioned in the mid-thoracic region. The lower abdominal sympathetic chains were isolated from the spinal cord. These chains innervate only smooth muscles, those of the hairs and the blood vessels, especially in the region of the tail, and the only connection between these structures and the heart was the vascular system. When the peripheral ends of these isolated chains were stimulated and the tail hairs erected, there followed in about two minutes a marked elevation of the arterial blood pressure and in about three minutes an increase of about twenty beats per minute in the cardiac rate. When the blood flow into and out from the tail was blocked the same stimulus had no effect, until the block was removed, and then the characteristic changes occurred. Stimulation of other sectioned sympathetic nerves also produced the same changes. It was obvious that sympathetic nerve impulses liberated peripherally a substance which mediated the response, and that this substance entering the blood-stream produced elsewhere, in the heart, effects similar to sympathetic impulses. It is important to note that the phenomenon occurs under normal conditions, for no drug is necessary to permit the demonstration of the presence of "sympathin," as Cannon proposed it be designated.

In many of its physiological manifestations and in other respects, as brought out by Bacq, sympathin resembles or even seems to be indistinguishable from epinephrine. Bacq seems inclined to the idea that they are identical, but Cannon, as the result of some researches carried out with Rosenblueth, believes that while similar, sympathin and epinephrine are not identical.

It is apparent, then, that impulses of the true sympathetic nerves also are transmitted peripherally by a chemical mediator: an epinephrine-like substance. The true sympathetic nerves are adrenergic.

An explanation of the use of the word "true" in this connection is necessary. As is well known, the sweat glands of the skin, although supplied by nerve fibers which are sympathetic in origin, respond to certain drugs as though they were supplied by parasympathetic fibers. In this respect these are not true sympathetic fibers. This peculiar phenomenon has been explained as the result of some of the studies on the transmission of impulses in autonomic nerves. Dale and Feldberg, perfusing with saline solution containing physostigmine, the foot of a cat, the hairless pads of which carry the sweat glands, showed that when the sympathetic nerves to the glands were stimulated, acetylcholine appears in the venous fluid. The sympathetic nerves supplying sweat glands are cholinergic and not adrenergic, then. It would appear that the chemical nature of the mediator is of significant importance, rather than the origin of the fiber which transmits the impulse. This view is in accord with that expressed many years ago by Langley.

Autonomic Ganglia and Central Nervous System.—Thus far consideration has been given only to the peripheral humoral transmission of autonomic nerve impulses, and it has been shown that definite chemical substances are the humoral agents. Researches by Feldberg and others indicate that nerve impulses are transmitted in the autonomic ganglia also by a humoral agent, acetylcholine. It appears, then, that all preganglionic nerve fibers are cholinergic. Dickshit has demonstrated the presence of acetylcholine in the brain, with a higher concentration in the basal ganglia, and occasionally present in the spinal fluid after stimulation of the vagus nerve. His suggestion that acetylcholine may be

a factor in the mediation of nerve impulses in the central nervous system is intriguing, but definite conclusions concerning its significance there must await further work.

CONCLUSION

A brief inquiry into the practical significance of these discoveries is in order. Some advances in biological knowledge are evident already, and most certainly the future holds in store for us many things which will be directly attributable to these newly acquired truths. A few examples illustrating this statement will have to suffice. The well known fact that either physiological or drug stimulation of parasympathetic nerves is quite circumscribed while that due to sympathetic stimulation is widely diffused is now explainable. Acetylcholine is very unstable and cannot under normal circumstances resist inactivation long enough to enter the general circulation and activate cholinergic fibers some distance removed. Sympathin, on the other hand, is relatively stable and can circulate in the blood and thus reach and stimulate large numbers of adrenergic fibers.

While the clinical value of epinephrine is well established, there is no doubt that many more chemically related compounds will be synthesized which will have modified actions, and for which new uses will be discovered. The clinical use of acetylcholine, or of choline derivatives, is merely in its infancy, and as new compounds are prepared, great advances in therapeutics can be looked for. Some choline derivatives are being investigated clinically, for example acetyl *beta* methylcholine. It has a marked "muscarine" action but practically no "nicotine" action, and its action is much more persistent than that of acetylcholine. This drug has been tried clinically in paroxysmal tachycardia, in peripheral vascular disease, in postoperative abdominal paresis, hypochlorhydria and in other diseases. Controlled therapeutic investigations will establish the truth concerning its, and related compounds, usefulness. It is well within reason to hope for advances, not only in therapeutics, but also in diagnostic measures, as the direct results of the above described discoveries.

REFERENCES

1. Dale, H. H.: Progress in Autopharmacology. Dohme Lectures. Bull. Johns Hop. Hosp., **103**:297, 1933.
2. Dale, H. H.: Chemical Transmission of Nervous Impulses. Brit. Med. Jour., No. 3827, p. 835, 1934.
3. Dale, H. H.: Pharmacology and Nerve Endings. Proc. Roy. Soc. Med., **128**:319, 1935.
4. Loewi, O.: The Humoral Transmission of Nervous Impulses. Harvey Lectures. Baltimore: Williams & Wilkins Co., May 18, 1933.
5. Alles, Gordon: The Physiological Significance of Choline Derivatives. Physiol. Rev., **14**:276, 1934.
6. Gibbs, G. S.: The Chemical Action of Nerves. Med. Ann. Dist. Columbia, **3**:244, 1934.

Southern Medical Journal

JOURNAL OF THE

SOUTHERN MEDICAL ASSOCIATION

Copyright, Southern Medical Association, 1936. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription, $4.00. Single copies, 35c each.

Entered as second-class matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

M. Y. DABNEY, M.D., Editor
EUGENIA B. DABNEY, M.S., Associate Editor
C. P. LORANZ, Secretary, Treasurer and General Manager

Volume 30 JANUARY 1937 Number 1

EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Thirty-First Annual Meeting
New Orleans, Louisiana, November 30-December 1-2-3, 1937

FRANK KELLS BOLAND

PRESIDENT OF THE SOUTHERN MEDICAL ASSOCIATION

Medical history and literature will refer to the newly elected President of the Southern Medical Association as Dr. Frank Kells Boland, of Atlanta. His father was Dr. Kells Hewitt Boland, who was born in Canada, and his mother Louise Bright Boland, a native of Ohio. He was born in Indianapolis on May 3, 1875, and moved to Atlanta at the age of four months, where his father practiced medicine for many years.

Frank Boland attended the Crew Street School in Atlanta, the Boys' High School, and the University of Georgia, from which he was graduated with the degree of Bachelor of Arts in 1897. To call him Frank is natural and easy, and one realizes in him the greatest gentleman of the generation. He was President of his class and made many a young heart warm during his college days with the magic rhythm of the violin which he loved and played well, but gave up when he began to study medicine. After completing his course at the University, he entered the Atlanta College of Physicians and Surgeons, now Emory University School of Medicine, and was graduated in 1900. He was a classmate of Dr. Stewart R. Roberts, of Atlanta, former President of the Southern Medical Association. After graduating he did postgraduate work at Johns Hopkins under Osler and the distinguished group of that time. He was intern and later resident in surgery at St. Joseph's Hospital in Baltimore until 1903, when he returned to Atlanta to practice.

In 1905 he married Molly Leila Horsley of West Point, Georgia, daughter of a physician, and she has been a constant inspiration and help to him through the years. They have two sons now practicing medicine, who, like their father, were famous football players at the University of Georgia, and who followed their father's footsteps into Phi Beta Kappa and Chi Phi. In 1926 the University of Georgia bestowed upon Dr. Boland the degree of Doctor of Science.

The new President has missed few meetings of the Southern Medical Association in twenty years. He has been president of his county and state medical societies, of the Chattahoochee Valley Medical Association, the Southeastern Surgical Congress, and the Southern Surgical Association. He served the Southern Medical Association as General Chairman for the Atlanta meeting in 1926, Chairman of the Section on Surgery in 1927, and later as member and Chairman of the Council. He is a fellow of the American College of Surgeons, the American Surgical Association and the American Association for Thoracic Surgery, and has been Vice-Chairman of the Section on General Surgery of the American Medical Association. He has made many valuable contributions to the SOUTHERN MEDICAL JOURNAL and to other scientific publications.* He has taught anatomy and surgery in Emory University School of Medicine since he entered the practice of medicine in 1903; from 1921 to 1930 was Professor of Surgery; and since 1930 has been Professor of Clinical Surgery.

During the War he was Lieutenant-Colonel in the Medical Corps and went overseas with the American Expeditionary Force. He was Chief of the surgical service at Base Hospital 43, in Blois, France, the Emory University Unit. At present he holds a commission as Colonel in the Medical Reserve Corps, U. S. Army.

Dr. Boland is President of the Crawford W. Long Memorial Association, and was largely instrumental in placing Dr. Long's statue in Statuary Hall in the National Capitol as one of Georgia's most illustrious sons.

In Atlanta Dr. Boland is a member of the Trinity Methodist Church, where he has served as Chairman of the Board of Stewarts. He is a member of the Rotary Club and of the Piedmont Driving Club.

No medical man in the South today counts more loyal friends than Frank Boland or is more loyal to them. From his alma mater, the University of Georgia, from his medical alma mater, the Emory University School of Medicine, from the church, neighbors, from his day and generation, he has been accorded the verdict in the hearts of all who know him of a good man, a good citizen, a good friend, an outstanding surgeon and a fine example to the youth of today. This well bestowed honor, the presidency of the Southern Medical Association, is but one of many elevations that he has received, and marks but another note in the high recognition given him by his fellows.

*Boland, Frank K.:

Varicocele and Its Operation. J.A.M.A., **50**:1888-1889 (June 6) 1908.
Henry Gray, Anatomist: An Appreciation. Amer. Jour. Med. Sci., **136**:429-435, 1908.
Traumatic Rupture of the Kidney. Report of Three Cases: Two Nephrectomies. Sou. Med. Jour., **6**:669-670 (Oct.) 1913.
A Tribute to the Physicians of the South Who Made the Supreme Sacrifice. Sou. Med. Jour., **12**:743 (Dec.) 1919.
Empyema: Recent Experiences. Sou. Med. Jour., **13**:198-201 (March) 1920.
Traumatic Rupture of the Bladder Through the Rectum: Round Worms in the Appendix. Report of Cases. Jour. Med. Assn. Ga., **10**:181 (May) 1920.
Postoperative Thrombophlebitis. Sou. Med. Jour., **14**:307-310 (April) 1921.
Some Observations on the Life of John Hunter. Jour. Med. Assn. Ga., **10**:632-637 (Aug.) 1921.
Crawford W. Long, the Discoverer of Anesthesia. Sou. Med. Jour., **15**:919-923 (Nov.) 1922.
Correlation of Physiology and Surgery. Sou. Med. Jour., **15**: 1007-1009 (Dec.) 1922.
Spontaneous Haematoma in Sarcoma of Kidney. Ann. Surg., **77**:311-313 (March) 1923.
Observations on the Gallbladder. Emory Med. Rev., **3**:1-7 (Oct.) 1925.
Acute Abdominal Pain. International Clinics, 1925.
Osteitis of the Coccyx. J.A.M.A., **88**:1883 (June 11) 1927.
Joseph Lister. Sou. Med. Jour., **21**:33 (Jan.) 1928.
Cases Illustrating Diagnosis of Acute Abdominal Diseases. Sou. Med. Jour., **22**:41 (Jan.) 1929.
Gas Gangrene in Compound Fractures. Ann. Surg., **90**:603-613 (Oct.) 1929.
Penetrating Wounds of the Chest. J.A.M.A., **93**:1716-1719 (Nov. 30) 1929.
Reducing the Mortality of Acute Intestinal Obstruction. Ky. State Med. Jour., **28**:116-121 (Feb.) 1930.
Florence Nightingale. Amer. Jour. Surg., **9**:148-151 (July) 1930.
Historical Medical Pageants. Int. Clinics, **2**:235-240 (Series 40), 1930.
Injuries of the Lungs and Pleura. Interstate Postgraduate Med. Assembly, 1931.
Abscess of the Liver. Ann. Surg., **194**:766-775 (Oct.) 1931.
Treatment of Pulmonary Tuberculosis by Surgical Collapse. International Clinics, 41st Series, **4**:89-95 (March) 1931.
Treatment of Acute Empyema by the Open Method. Sou. Med. Jour., **25**:151 (Feb.) 1932.
Results in the Treatment of Acute Appendicitis. J.A.M.A., **99**:443-448 (Aug. 6) 1932.
Differential Diagnosis of Abdominal Tumors. Jour. Med. Assn. Ala., **2**:427-433 (May) 1933.
Acute Intestinal Obstruction in the Negro. Ann. Surg., **98**: 698-705 (Oct.) 1933.
Diverticulitis and Carcinoma of the Colon. Jour. Fla. Med. Assn., **20**:157-160 (Oct.) 1933.
Five-Year Cancer Cures in the South. Surg., Gyn. & Obst., **58**:427-428 (Feb. 15) 1934.
The Interpretation of Abdominal Pain. Sou. Med. Jour., **28**: 133-137 (Feb.) 1935.
Progress in Surgery. Amer. Jour. Surg., **28**:193-200 (May) 1935.
Peptic Ulcer and Diseases of the Biliary Tract in the Southern Negro. Ann. Surg., **102**:724-727 (Oct.) 1935.
The Mesentery. Surg., Gyn. & Obst., **61**:838-839 (Dec.) 1935.
Surgical Complications of Amebiasis. Sou. Med. & Surg., **98**: 7-12 (Jan.) 1936.
Surgical Diseases of the Gastro-Intestinal Tract in Children. International Clinics, **2**:26-33 (June) 1936.
Traumatic Surgery of the Lungs and Pleura. Ann. Surg., **104**:572-578 (Oct.) 1936.

LIVER EXTRACTS

Chloroform ($CHCl_3$) has lost much of its popularity as an anesthetic, one of the reasons being that it is capable of producing necrosis of the liver. Similarly carbon tetrachloride (CCl_4) a valuable anthelmintic, may injure the liver. A dog which has had a high calcium ration before the administration of the latter drug, appears to be protected from its poisonous action, and shows few toxic symptoms, though it is reported that the liver injury occurs just the same.[1]

Recently various reports have dealt with a method of protection of liver tissue against damage from several poisons. This is accomplished by preliminary injection of liver extracts. According to Forbes, Neale, and Scherer,[1] of the Medical College of Virginia, who experimented with a large series of rats, liver injury from chloroform and carbon tetrachloride can be very largely prevented if the animals are previously treated with a potent preparation of the latter organ. Thus from normal liver can be derived a substance which acts to spare liver cells in the rat's body from the necrotizing action of well-known poisons. The nature of the protective liver material was investigated. Choline was not active, and glucose had no effect. Potent anti-anemia preparations failed to prevent damage from breathing these toxic compounds.[1] It

1. Forbes, J. C.; Neale, R. C.; and Scherer, J. H.: A Liver Preparation Protecting against Chloroform or Carbon Tetrachloride Administration. Jour. Pharmac. & Exper. Ther., **58**:402 (Dec.) 1936.

would be of some interest to know whether the anti-chloroform preparations have any blood stimulating effect.

Ruffin and Smith,[2] in studying the effect of several liver extracts upon pellagra, observe that fractions very effective in arresting pernicious anemia may be much less beneficial to pellagrins. In the preparation of the usual commercial liver extracts for intravenous or intramuscular injection into patients with pernicious anemia, a residue which alleviates symptoms of pellagra is discarded. If the residue, as well as the extract is given to pellagrins on a very defective diet, recovery is much more readily obtained.[2] In other words, it has been suggested that two factors from liver are required to correct the symptoms of pellagra. The anti-pernicious anemia principle alone is not enough.

Investigators thus would seem to have derived from liver: (1) a material which produces remissions of pernicious anemia; (2) a different substance or substances more useful in the treatment of pellagra; as well as (3) something which is capable of protecting the individual and particularly the liver *in vivo* against the action of poisons.

There is some difference of opinion as to whether the liver treatment of pernicious anemia, which has now been in clinical use for nine years, is capable of preventing the neurological complications of this disease. It is suggested that the different action of various liver preparations now available should be taken into account, one being perhaps more effective than another over a period of years.[3]

The potentiality of liver as a storehouse of medicaments is just beginning to be explored. Perhaps this organ should be eaten in large quantities for many adult ills. There is also the opposite possibility, however, that a tissue which absorbs many harmful materials to detoxify them in the body, as the liver does, must in time become saturated with injurious substances, products of detoxification.

Efforts to separate therapeutic principles from inactive portions of the gland would seem to be commendable.

2. Ruffin, Julian M.; and Smith, David T.: A Clinical Evaluation of the Potency of Various Extracts of Liver in the Treatment of Pellagra. THE JOURNAL, this issue, p. 4.

3. Needles, William: Can the Neurologic Complications of Pernicious Anemia Be Prevented? Arch. Int. Med., **58**:765 (Nov.) 1936.

GLEANINGS FROM RECENT JOURNALS

Stimulation of Intestinal Peristalsis with Drugs.—Many studies have been made of the effect of posterior pituitary principles on animal peristalsis, and some conflicting reports have appeared. Surgical patients with colostomy, ileostomy and other operations offer good opportunities for observation of the effects of drugs on the human intestine. Several materials used to combat postoperative intestinal obstruction or paralytic ileus have been recently investigated by Guthrie and Bargen,[1] of Rochester. They have studied the muscular reaction of several segments of human intestine after administration of pituitary extract, physostigmine, acetyl choline, and a cascara extract. Following injections of physostigmine or acetyl choline there was little or no peristalsis and no feces were passed. The cascara extract produced only slight cramping and contraction. Pituitary extracts were the only effective materials employed. Within three to five minutes after the administration of active posterior pituitary preparations, huge waves of peristalsis appeared, with powerful muscular contractions. These occurred every three to five minutes and diminished, to cease in three-quarters to an hour and a half later. The patient complained of abdominal cramps and passed copious feces. Pituitary extract was thus the only effective peristaltic stimulant investigated.

Necheles, Maskin, Strauss and Taft,[2] of Chicago, also observing patients with fistulas, agree that the human intestine responds to posterior pituitary extracts with increase in tonus and peristalsis. Violent contractions and tetanus were observed in some of their patients. They urge caution in the clinical use of vasopressin, the pure pressor principle of the posterior pituitary gland, particularly if the intestinal wall is in any way weakened.

Sugar Tolerance.—As the guinea-pig develops mild scurvy, its ability to utilize sugar (glucose) is decreased, according to Segal and King,[3] of the University of Pittsburgh. The blood sugar tolerance curve rises with successive stages

1. Guthrie, J. S.; and Bargen, J. A.: Effect of Drugs on Different Segments of the Intestine of Man. Surg., Gyn. & Obst., **63**:743 (Dec.) 1936.

2. Necheles, H.; Maskin, M.; Strauss, S.; Strauss, A. A.; and Taft, E.: Effect of Posterior Pituitary Extracts on the Motility of the Gastro-Intestinal Tract. Arch. Surg., **33**:780 (Nov.) 1936.

3. Segal, A.; and King, C. G.: Relationship of Vitamin C to Glucose Tolerance in Guinea-Pigs. Jour. Biol. Chem., **116**:489 (Dec.) 1936.

of vitamin C deficiency. When the vitamin is restored, the curve returns to normal.

The glucose tolerance curve is usually taken to be an estimate of the individual's ability to utilize an unusual quantity of glucose. In prediabetic stages and in some other clinical disturbances it is said to be abnormally high. The effect of heavy vitamin C administration on these latter patients will be of interest, as might the administration of large doses of crystalline cevitamic acid in early diabetes.

Pituitary Cycle.—The pituitary has been called the motor of the body. When it is extirpated, other ductless glands show a gradual atrophy. Its cell staining reactions, that is, the proportion of base-staining, acid-staining and non-staining cells, have been much studied, particularly since the demonstration that it produces periodically substances which stimulate the ovary. The basophil cells of the anterior pituitary of a hibernating animal increase in number as it awakens in the spring.[1] "Pregnancy cells" and "castration cells" have been reported.

Chadwick,[1] of Vanderbilt University, compared microscopic sections of the anterior pituitary of the adult female guinea-pig with the histologic changes of its ovary. He reports a high level of stained cells in the anterior pituitary as the ovarian follicle develops, and a low level with the corpus luteum. Basophils were high before estrus, acidophils in early estrus. The basic colloid of the anterior pituitary increased with increasing weight of the animal.

Toxicity of Heavy Water.—Deuterium oxide, or water which contains twice the ordinary proportion of hydrogen, is said to produce typical symptoms of poisoning. Mice, upon receiving daily doses by stomach tube,[2] develop pink stomachs, lose their appetite, lose weight rapidly, and their secretion of urine is diminished. The temperature falls and they become hyperexcitable. The symptoms somewhat resemble those of strychnine poisoning, but without convulsions. Death follows in a few days. This material is of much chemical and increasing physiologic interest.

1. Chadwick, C. S.: Cyclic Morphologic Variations in the Anterior Hypophysis of the Guinea-Pig. Amer. Jour. Anat., **60**: 129 (Nov. 15) 1936.

2. Barbour, H. G.; and Trace, Jane: Pharmacological Action of Deuterium Oxide. Toxicity and Symptoms. Metabolic Rate. Water Exchanges. Jour. Pharmac. & Exper. Ther., **58**:460 (Dec.) 1936.

TWENTY-FIVE YEARS AGO

From Journals of 1912

Peristaltic Hormone.—"It has been demonstrated recently that the cells of the mucous membrane of the stomach elaborate a chemical substance that stimulates the peristalsis of the intestine. * * * The injection is made only once and the median vein is the best place for it. * * * It is advisable to follow up the injection with one dose of castor oil. It serves as a lubricant while the hormone induces the normal peristaltic action. * * * Zuelzer thinks that the peristaltic hormone may turn out to be also a means for differential diagnosis. * * * We have in the peristaltic hormone treatment of constipation a new and very promising method * * * must not be regarded as a cure-all."[1]

Salvarsan in Pernicious Anemia.—"Miss E. V. (nurse) had been in California, where the diagnosis of pernicious anemia was made * * * blood examination showed a typical picture of pernicious anemia, with great numbers of megaloblasts and all the other concomitant features. * * * The patient had had large quantities of iron and arsenic before reaching the city. October 10, 1911, 0.3 gm. salvarsan in sesame oil was given in the gluteal region. * * * The patient's improvement was rapid and, as can be seen from the table, she now presents no evidence of pernicious cachexia * * * the changes after the administration of salvarsan were certainly very striking."[2]

Traffic Deaths.—"Vehicular traffic was responsible for the death of 423 persons and the injury of 2,004 others in this city [New York City] during 1911 * * * an increase of 13 per cent over the fatalities of 1910."[3]

Pyelography.—"This term has recently been coined for the process of injecting a silver salt into the kidney pelvis for roentgenoscopy. Nogier and Reynard report two cases in which this alone cleared up the diagnosis, revealing intermittent hydronephrosis in one case and in the other a small cavity with irregular edges, undoubtedly of tuberculous origin, and thus permitting radical treatment in time."[4]

1. Aaron, C. D.: The Hormones, with Special Reference to Peristaltic Hormone. J.A.M.A., **58**:407, 1912.

2. Friedlander, Alfred: Salvarsan in Pernicious Anemia. J.A.M.A., **58**:406, 1912.

3. J.A.M.A., **58**:125, 1912.

4. J.A.M.A., **58**:229, 1912.

Correspondence

ACIDS IN TREATMENT OF VULVO-VAGINITIS IN CHILDREN

Editor, Southern Medical Journal:

In the treatment of gonorrheal vulvo-vaginitis with estrogenic hormone it was noticed that a cure was not obtained until the child's vaginal pH remained continuously below pH 5.5. The vagina was kept continuously acid by local medication, and it was also found on biopsy that a reaction of epithelialization was present, very

similar to that obtained after hormone treatment. A cure of gonorrheal vaginitis was obtained.

Any jelly or non-irritating substance can be used just so long as the material has a pH of 3.0 to 3.3 and remains continuously in the vagina. A contraceptive jelly with a pH 3.0 was employed and the same good results followed, but this material ran out of the vagina. Finally, glucose and lactose were added to the jelly in order that they might dissolve gradually and in so doing keep the vagina at a pH of approximately 4.0 (normal adult vaginal pH).

The most satisfactory method of treatment was by the insertion of acidulated glucose-lactose tablets into the vagina three times a day for thirty days with no douches during that time. After thirty days the mother is to douche the vagina out with normal physiological douche, pH 4.0 (3 tablespoonfuls 5 per cent acetic acid to 2 quarts of warm tap water) three to five times a day, using an ear syringe.

The percentage of cures is approximately the same as that given by other authors by the use of the estrogenic hormone. This treatment has been used in approximately two hundred cases.

KARL JOHN KARNAKY, M. D.
2618 Crawford Street,
Houston, Texas.
November 2, 1936.

Book Reviews

Preventive Medicine. By Mark F. Boyd, M.D., M.S., C.P.H., Member of Regular Field Staff, International Health Division of the Rockefeller Foundation; Formerly Professor of Bacteriology and Preventive Medicine in the Medical Department of the University of Texas. Fifth Edition, Reset. 561 pages with 155 illustrations. Philadelphia: W. B. Saunders Company, 1936. Cloth, $4.50.

This is an excellent book covering the field of preventive medicine and public health. It is primarily intended as a text for medical students and, as such, has been widely used and has given general satisfaction. The new edition will prove equally valuable. The book will also prove a valuable addition to the library of any public health organization, and could well be studied by lay persons engaged in public health.

While not exhaustive, discussions are pointed and clear. No important features are omitted. New material has been included on colds, ringworm, psittacosis, tuberculosis, malaria, encephalitis, poliomyelitis, diphtheria, typhus, and relapsing fever.

Syphilis Sive Morbus Humanus: A Rationalization of Yaws So-Called. By Charles S. Butler, A.B., M.D., LL.D., Rear Admiral (MC), U. S. Navy, Member American Academy of Tropical Medicine; President (1935-36), New York Society of Tropical Medicine. 137 pages, illustrated. Lancaster, Pennsylvania: The Science Press Printing Company, 1936.

The author believes that syphilis and yaws are the same disease. The clinical differences between the two conditions are dependent upon the fact that yaws is usually acquired innocently among people living under relatively primitive and unhygienic conditions. He cites much evidence to show that the two disorders respond similarly to treatment; that either will protect against inoculation with the other; that complications such as aneurysm, which are supposedly specific for syphilis, also occur in persons affected with yaws. He explains the low instance of paresis and tabes among the natives with yaws by pointing out that in this group of subjects syphilis also rarely leads to these complications and thinks it possible that the high incidence of malaria plus the severity of the dermal manifestations probably account for the relative immunity of the nervous system in primitive peoples. He believes that the evidence which he has cited establishes beyond question the identify of these two disorders, and he defines yaws as follows: "Yaws is epidemic non-venereal syphilis transmitted innocently among primitive peoples, and under stone-age conditions of personal hygiene constitutes one of the exanthemata of childhood. It is then called yaws, framboesia, pian, bubas and so on, variously, according to the race and language of those affected."

Considerable evidence is cited indicating the fallacy of the widely accepted view which holds that syphilis first arose in America. His opinion in this regard is in accord with that of most of the recent students of this question.

The writer of the book makes an eloquent plea for a wider dissemination among the public of the known facts in regard to syphilitic infection. He thinks that only by this means can any important additional steps in eradication of the disease be accomplished. In this point of view he is in accord with the tendency of the times. In addition to the helpful data concerning the medical aspects of syphilis, the book is of interest because of the wide culture of the author, the clear, attractive style of the writing and the many references to classical non-medical learning.

An Introduction to Materia Medica and Pharmacology. By Hugh Alister McGuigan, Ph.D., M.D., Professor of Materia Medica, Pharmacology and Therapeutics, University of Illinois, College of Medicine, Chicago; and Edith P. Brodie, A.B., R.N., formerly Director of School of Nursing, Vanderbilt University, Nashville, Tennessee; formerly Instructor in Materia Medica and Therapeutics, Washington University School of Nursing, St. Louis, Missouri. 580 pages, illustrated. St. Louis: The C. V. Mosby Company, 1936. Cloth, $2.75.

This is an elementary text of pharmacology designed mainly for nurses. It is divided into two parts. The first part deals with the basic principles, as the different types of preparations, historical background, chemistry, and therapeutic actions of drugs. The second part is more advanced, giving dosages, methods of administration, poisons and the actions of drugs on certain systems. The latest edition of the pharmacopeia has been followed. The book is written in simple language and is suitable for those for whom it is designed.

BOOK REVIEWS continued on page 131

Officers

OFFICERS 1936-1937

The following is a complete roster of the officers of the Southern Medical Association for 1936-1937, and of associations meeting conjointly with the Southern Medical Association:

President—Dr. Frank K. Boland, Atlanta, Georgia.

First Vice-President—Dr. Sydney R. Miller, Baltimore, Maryland.

Second Vice-President—Dr. Lea A. Riely, Oklahoma City, Oklahoma.

Secretary-Manager (Secretary, Treasurer and General Manager)—Mr. C. P. Loranz, Birmingham, Alabama.

Editor of Journal—Dr. M. Y. Dabney, Birmingham, Alabama.

Associate Editor of Journal—Mrs. Eugenia B. Dabney, Birmingham, Alabama.

Councilors—Dr. C. W. Dowden, Chairman, Louisville, Kentucky; Dr. M. Toulmin Gaines, Mobile, Alabama; Dr. Harvey S. Thatcher, Little Rock, Arkansas; Dr. Wm. Thornwall Davis, Washington, D. C.; Dr. Luther W. Holloway, Jacksonville, Florida; Dr. Edgar G. Ballenger, Atlanta, Georgia; Dr. Arthur A. Herold, Shreveport, Louisiana; Dr. J. Mason Hundley, Jr., Baltimore, Maryland; Dr. Harvey F. Garrison, Jackson, Mississippi; Dr. Alphonse McMahon, St. Louis, Missouri; Dr. Hamilton W. McKay, Charlotte, North Carolina; Dr. W. K. West, Oklahoma City, Oklahoma; Dr. Kenneth M. Lynch, Charleston, South Carolina; Dr. Eugene Rosamond, Memphis, Tennessee; Dr. Guy F. Witt, Dallas, Texas; Dr. Vincent W. Archer, University, Virginia; Dr. James R. Bloss, Huntington, West Virginia.

Board of Trustees (All are Past-Presidents)—Dr. Felix J. Underwood, Chairman, Jackson, Mississippi; Dr. Lewis J. Moorman, Oklahoma City, Oklahoma; Dr. Irvin Abell, Louisville, Kentucky; Dr. Hugh Leslie Moore, Dallas, Texas; Dr. H. Marshall Taylor, Jacksonville, Florida; Dr. Fred M. Hodges, Richmond, Virginia.

Section on Medicine—Dr. Chas. Hartwell Cocke, Chairman, Asheville, North Carolina; Dr. Henry G. Rudner, Vice-Chairman, Memphis, Tennessee; Dr. John B. Youmans, Secretary, Nashville, Tennessee.

Section on Pediatrics—Dr. Gilbert J. Levy, Chairman, Memphis, Tennessee; Dr. D. C. Wharton Smith, Vice-Chairman, Baltimore, Maryland; Dr. Hughes Kennedy, Jr., Secretary, Birmingham, Alabama.

Section on Gastroenterology—Dr. Harry Eldridge Murry, Chairman, Texarkana, Arkansas-Texas; Dr. Fred W. Wilkerson, Vice-Chairman, Montgomery, Alabama; Dr. Lay Martin, Secretary, Baltimore, Maryland.

Section on Pathology—Dr. Wiley D. Forbus, Chairman, Durham, North Carolina; Dr. Everett L. Bishop, Vice-Chairman, Atlanta, Georgia; Dr. Roy R. Kracke, Secretary, Emory University, Georgia.

Section on Neurology and Psychiatry—Dr. Lawrence F. Woolley, Chairman, Towson, Maryland; Dr. Frank H. Luton, Vice-Chairman, Nashville, Tennessee; Dr. S. Spafford Ackerly, Secretary, Louisville, Kentucky.

Section on Radiology—Dr. D. A. Rhinehart, Chairman, Little Rock, Arkansas; Dr. Hunter B. Spencer, Vice-Chairman Lynchburg, Virginia; Dr. Roy G. Giles, Secretary, Temple, Texas.

Section on Dermatology and Syphilology—Dr. Harry M. Robinson, Chairman, Baltimore, Maryland; Dr. J. Richard Allison, Vice-Chairman, Columbia, South Carolina; Dr. Winston U. Rutledge, Secretary, Louisville, Kentucky.

Section on Surgery—Dr. Alton Ochsner, Chairman, New Orleans, Louisiana; Dr. William F. Rienhoff, Jr., Vice-Chairman, Baltimore, Maryland; Dr. J. M. T. Finney, Jr., Secretary, Baltimore, Maryland.

Section on Bone and Joint Surgery—Dr. Guy A. Caldwell, Chairman, Shreveport, Louisiana; Dr. Alfred R. Shands, Jr., Vice-Chairman, Durham, North Carolina; Dr. J. Hiram Kite, Secretary, Atlanta, Georgia.

Section on Gynecology—Dr. John C. Burch, Chairman, Nashville, Tennessee; Dr. R. A. Ross, Vice-Chairman, Durham, North Carolina; Dr. John F. Lucas, Secretary, Greenville, Mississippi.

Section on Obstetrics—Dr. Warren E. Massey, Chairman, Dallas, Texas; Dr. John McF. Bergland, Vice-Chairman, Baltimore, Maryland; Dr. Milton Smith Lewis, Secretary, Nashville, Tennessee.

Section on Urology—Dr. Hamilton W. McKay, Chairman, Charlotte, North Carolina; Dr. Albert E. Goldstein, Vice-Chairman, Baltimore, Maryland; Dr. Jefferson C. Pennington, Secretary, Nashville, Tennessee.

Section on Railway Surgery—Dr. J. W. Palmer, Chairman, Ailey, Georgia; Dr. Edward V. Milholland, Vice-Chairman, Baltimore, Maryland; Dr. George A. Traylor, Secretary, Augusta, Georgia.

Section on Ophthalmology and Otolaryngology—Dr. Grady E. Clay, Chairman, Atlanta, Georgia; Dr. Oscar M. Marchman, Vice-Chairman, Dallas, Texas; Dr. John R. Hume, Secretary, New Orleans, Louisiana.

Section on Medical Education—Dr. C. C. Bass, Chairman, New Orleans, Louisiana; Dr. Stuart Graves, Vice-Chairman, University, Alabama; Dr. Harvey S. Thatcher, Secretary, Little Rock, Arkansas.

Section on Public Health—Dr. T. H. D. Griffitts, Chairman, Savannah, Georgia; Dr. W. B. Grayson, Vice-Chairman, Little Rock, Arkansas; Dr. W. C. Williams, Secretary, Nashville, Tennessee.

American Public Health Association, Southern Branch (meeting conjointly with Southern Medical Association)—Dr. Victor H. Bassett, President, Savannah, Georgia; Mr. E. S. Tisdale, First Vice-President, Charleston, West Virginia; Miss Pearl McIver, Second Vice-President, Washington, D. C.; Dr. Fred W. Caudell, Third Vice-President, Louisville, Kentucky; Dr. G. Foard McGinnes, Secretary-Treasurer, Richmond, Virginia.

National Malaria Committee (meeting conjointly with Southern Medical Association)—Dr. L. O. Howard, Honorary Chairman, Washington, D. C.; Dr. W. V. King, Chairman, Orlando, Florida; Dr. T. H. D. Griffitts, Chairman-Elect, Savannah, Georgia; Mr. L. M. Clarkson, Vice-Chairman, Atlanta, Georgia; Dr. Mark F. Boyd, Secretary-Treasurer, Tallahassee, Florida.

American Society of Tropical Medicine (meeting conjointly with Southern Medical Association)—Dr. Herbert C. Clark, President, Panama, R. de P.; Dr. Mark F. Boyd, President-Elect, Tallahassee, Florida; Dr. Karl F. Meyer, Vice-President, San Francisco, California; Dr. N. Paul Hudson, Secretary-Treasurer, Columbus, Ohio; Dr. Charles F. Craig, Editor, New Orleans, Louisiana.

Allergy Clinic and Round Table (meeting conjointly with Southern Medical Association)—Dr. J. Harvey Black, Chairman, Dallas, Texas; Dr. Oscar Swineford, Jr., Vice-Chairman, Charlottesville, Virginia; Dr. Charles H. Eyermann, Secretary, St. Louis, Missouri.

American Academy of Pediatrics, Region 2 (meeting conjointly with Southern Medical Association)—Dr. Edward Clay Mitchell, Chairman, Memphis, Tennessee.

Women Physicians of the Southern Medical Association—Dr. Leta J. White, Chairman, Petersburg, Virginia; Dr. Regena C. Beck, Vice-Chairman, Richmond, Virginia; Dr. Edna S. Pennington, Secretary, Nashville, Tennessee; Dr. Lillian H. South, Historian, Louisville, Kentucky.

Woman's Auxiliary to the Southern Medical Association—Mrs. Frank N. Haggard, President, San Antonio, Texas; Mrs. Luther Bach, President-Elect, Bellevue, Kentucky; Mrs. W. K. West, First Vice-President, Oklahoma City, Oklahoma; Mrs. W. T. Wootton, Second Vice-President, Hot Springs, Arkansas; Mrs. R. H. Clark, Recording Secretary, Hattiesburg, Mississippi; Mrs. H. O. Wyneken, Corresponding Secretary, San Antonio, Texas; Mrs. Chas. P. Corn, Treasurer, Greenville, South Carolina; Mrs. B. S. Preston, Historian, Charleston, West Virginia; Mrs. Olin S. Cofer, Parliamentarian, Atlanta, Georgia.

Southern Medical Association

Minutes of Thirtieth Annual Meeting

Baltimore, Maryland, November 17-20, 1936

GENERAL PUBLIC SESSION

Tuesday, November 17, 8:15 p. m.

A General Public Session was held at the Lyric Theater, Baltimore, Maryland, and was called to order by the General Chairman, Dr. Sydney R. Miller, Baltimore, who presided.

Dr. Jonathan C. Meakins, Professor of Medicine, McGill University Faculty of Medicine, Montreal, Canada, presented the subject, "Heart Disease Versus Longevity."

Dr. Thomas Parran, Jr., Surgeon General, United States Public Health Service, Washington, D. C., presented the subject, "Syphilis as a Public Health Problem."

Dr. Irvin Abell, Clinical Professor of Surgery, University of Louisville School of Medicine, and Past President, Southern Medical Association, Louisville, Kentucky, presented the subject, "The Role of Surgery and Hospital in Fighting Disease."

Rev. Alphonse M. Schwitalla, S.J., Ph.D., Dean, St. Louis University School of Medicine, St. Louis, Missouri, presented the subject, "Society's Debts to the Doctor."

Music by the Johns Hopkins Orchestra, Bart Wirtz, Conductor.

GENERAL SESSION

PRESIDENTS' NIGHT

Wednesday, November 18, 8:15 p. m.

The Association met in General Session at the Lord Baltimore Hotel, Ballroom, Baltimore, Maryland, and was called to order by Dr. Sydney R. Miller, of Baltimore, General Chairman of the Committee on Arrangements, who presided during the first part of the session.

Rev. S. Tagart Steele, Jr., D.D., Rector, Saint David's Episcopal Church, Baltimore, delivered the Invocation.

Dr. Chas. C. W. Judd, President, Baltimore City Medical Society, Baltimore, delivered an Address of Welcome in behalf of the Society and of Baltimore.

Dr. F. D. Chappelear, President, Medical and Chirurgical Faculty of the State of Maryland, Hughesville, delivered an Address of Welcome in behalf of the State Society and of Maryland.

Dr. James M. Martin, Dallas, Texas, responded to the Addresses of Welcome in behalf of the Southern Medical Association.

Mr. James E. Hancock, President for Maryland, Society of the War of 1812, Baltimore, made some remarks on the origin of the Star Spangled Banner.

Mrs. Harriett Zell Colston, wife of Dr. J. A. C. Colston, Baltimore, and daughter of Dr. Hugh H. Young, Baltimore, rendered a solo, the Star Spangled Banner, accompanied by Mr. Laurence Petran.

Sitting with the President, by his invitation, in addition to the Past-Presidents of the Southern Medical Association, were a number of Presidents of other medical associations, state, regional and national, and all were individually introduced by Mr. C. P. Loranz, Secretary-Manager, at the request of the President.

Dr. Sydney R. Miller, General Chairman, introduced the President of the Southern Medical Association, Dr. Fred M. Hodges, Richmond, Virginia, who presided during the remainder of the session.

Dr. Fred M. Hodges, of Richmond, Virginia, President of the Southern Medical Association, read his President's Address entitled "The Roentgen Ray—Facts and Fictions" (published in the December issue of the JOURNAL, page 1151).

REPORT OF THE COUNCIL

Dr. M. Pinson Neal, Columbia, Missouri, Chairman of the Council, presented the following report for the Council:

To the Members of the Southern Medical Association:

The Council convened in two regular sessions in Parlor H, Lord Baltimore Hotel, Baltimore, Maryland, Tuesday and Wednesday, November 17 and 18, 1936, at 12:30 p. m. Present: Dr. M. Pinson Neal, Chairman, Columbia, Missouri; Dr. M. Toulmin Gaines, Mobile, Alabama; Dr. Harvey S. Thatcher, Little Rock, Arkansas; Dr. William Thornwall Davis, Washington, District of Columbia; Dr. Luther W. Holloway, Jacksonville, Florida; Dr. Edgar G. Ballenger, Atlanta, Georgia; Dr. C. W. Dowden, Louisville, Kentucky; Dr. Arthur A. Herold, Shreveport, Louisiana; Dr. Edward A. Looper, Baltimore, Maryland; Dr. Harvey F. Garrison, Jackson, Mississippi; Dr. Paul H. Ringer, Asheville, North Carolina; Dr. Eugene Rosamond, Memphis, Tennessee; Dr. Guy F. Witt, Dallas, Texas; Dr. Vincent W. Archer, University, Virginia; Dr. James R. Bloss, Huntington, West Virginia. Sitting with the Council: Dr. Fred M. Hodges, President, Richmond, Virginia; Dr. M. Y. Dabney, Editor, Birmingham, Alabama; and Mr. C. P. Loranz, Secretary-Manager, Birmingham, Alabama.

The Council stood with bowed heads for a brief period in memory of the late Dr. Homer Dupuy, of New Orleans, Louisiana, and Dr. W. McKim Marriott, of St. Louis, Missouri, former members of the Council, who had passed away since the last meeting of the Council.

Invitations of the Orleans Parish Medical Society to meet in New Orleans and the Jefferson County (Kentucky) Medical Society to meet in Louisville were presented, delegations from both cities appearing before the Council. The invitation presented last year from Oklahoma City to meet there in 1937 was withdrawn to be presented next year for the 1938 meeting. The invitation of the Orleans Parish Medical Society to meet in New Orleans was accepted, the date decided upon to be November 30--December 1-2-3, 1937.

The report of the special Committee on Membership was read, approved and ordered filed. The committee, composed of Dr. Frank K. Boland, Dr. James R. Bloss and Dr. Edward T. Newell, was continued for another year.

Dr. Hugh Leslie Moore, a former member of the Council and a past President of the Association, appeared before the Council as a representative of the American Academy of Pediatrics, Re-

gion 2, and asked that a special committee from the Council be appointed to meet with a committee from the Academy, Region 2, to consider a change in the program plan for pediatrics. The Chairman appointed Dr. L. W. Holloway, Dr. Eugene Rosamond and Dr. Vincent W. Archer. At the next meeting of the Council the Committee made the following report, which was adopted: That for next year as an experiment (1) the Section on Pediatrics meet on Thursday and Friday forenoons; (2) that the Academy of Pediatrics, Region 2, have its program on Thursday and Friday afternoons; (3) that Wednesday afternoon, under the auspices of the Section on Pediatrics, outstanding speakers give discussions of ten to fifteen minutes on pediatric subjects; and (4) that adherence be made strictly to the time rule governing all these pediatric meetings.

The question was raised as to the desirability of some kind of an affiliation between this Association and physicians in Latin American countries. A committee composed of Dr. William Thornwall Davis, Dr. Kenneth M. Lynch and Dr. Edgar G. Ballenger was appointed to study the matter and report to the Council next year.

Discussion was had on the question of whether or not the Association should permit the officers of the sections to raise funds within their respective groups, if they so desired, to provide stenographers to report the sections and to pay the expenses of out-of-territory essayists. It was moved and carried that such permission be granted.

The Report of the Board of Trustees, incorporating the Report of the Secretary-Manager, was read and approved.

REPORT OF THE TRUSTEES

To the Council of the Southern Medical Association:

The Trustees of the Southern Medical Association met in Private Dining Room G of the Lord Baltimore Hotel, Baltimore, Maryland, Wednesday, November 18, at 8:00 a. m. Present: Dr. Felix J. Underwood, Jackson, Mississippi, Acting Chairman; Dr. Lewis J. Moorman, Oklahoma City, Oklahoma; Dr. Irvin Abell, Louisville, Kentucky; and Dr. Hugh Leslie Moore, Dallas, Texas. Sitting with the Trustees: Dr. Fred M. Hodges, President, Southern Medical Association, Richmond, Virginia, and Mr. C. P. Loranz, Secretary-Manager, Birmingham, Alabama.

The Secretary-Manager, Mr. C. P. Loranz, presented the report for the fiscal year ending October 31, 1936. The report was approved as presented and is here transmitted to the Council.

The Trustees by unanimous vote gave to the Secretary-Manager, Mr. C. P. Loranz, their approval, confidence and appreciation of him and his work, and to those associated with him in the editorial and business offices at headquarters.

The Trustees recommended a salary increase of $25.00 a month to the Secretary-Manager and the same amount to the Editorial Department.

The Trustees authorized the Secretary-Manager to purchase United States Savings Bonds to such an amount as he deems he can spare from the active funds of the Association.

There being no further business, the Trustees adjourned.

(Signed) FELIX J. UNDERWOOD, *Acting Chairman.*

REPORT OF SECRETARY-MANAGER

To the Southern Medical Association:

A detailed financial statement for the fiscal year ending October 31, 1936, is here given and is self-explanatory. It will be noted that the net profit for the year is $3,179.42. The cash on hand in bank and as shown by the cash book is $3,955.45.

Included in the assets of the Association are registered United States Government Bonds, purchase value $15,156.40. Of these there are Treasury Bonds, for which we paid $9,831.40, par value $10,000.00, due 1946/1956, yielding 3¼ per cent interest; and United States Savings Bonds, for which we paid $5,325.00, maturity value $7,100.00 in ten years, which is a yield of approximately 2.9 per cent per year for the ten-year period. The purchase of these bonds was authorized by the Board of Trustees.

The books of the Association will be audited by Francis B. Latady and Company, Certified Public Accountants, and their report will appear in the published minutes.

Last year we reported 6,567 members, and during the year we have received 1,013 new members. The losses from resignations, deaths and suspensions were 669, leaving a net membership at this time of 6,911, a net gain for the year of 344. A comparative statement of the membership for the past six years accompanies this report.

As your Secretary, Treasurer and General Manager, carrying the title of Secretary-Manager, I have endeavored this year, as I have in past years, to conduct your affairs in a satisfactory manner, trying at all times to be faithful and efficient. I have tried to be as economical as possible and to carry on the Association activities at the lowest cost without curtailing any more than possible the size of the JOURNAL each month and other Association activities.

I wish to express my appreciation for the cooperation of the President, Dr. Fred M. Hodges, and all other officers, general and of the sections, and of the Editor, Dr. M. Y. Dabney, and Associate Editor, Mrs. Dabney, and all those working with me at headquarters, as well as the General Chairman for the Baltimore meeting, Dr. Sydney R. Miller, and those working with him. I appreciate their help and cooperation.

(Signed) C. P. LORANZ, *Secretary-Manager.*

REPORT OF AUDITOR

SOUTHERN MEDICAL ASSOCIATION:

We have audited the books and accounts of the Southern Medical Association, of Birmingham, Alabama, for the year ended October 31, 1936, and

WE HEREBY CERTIFY that, in our opinion, the Trial Balance, Summary of Earnings, Statement of Assets and Liabilities, and Analysis of the Surplus Account, as at October 31, 1936, which are hereto attached, correctly set forth the condition of the Association as at October 31, 1936, and the results of its operations for the fiscal year ended on that date.

The item of Profit and Loss, amounting to $424.20, consisted entirely of Depreciation on Furniture and Fixtures.

The total revenue amounted to $63,383.47 as compared with $52,917.13 the previous year, being an increase of $10,466.34. The expenses, including Depreciation, amounted to $60,203.55 as compared with $48,423.79, an increase of $11,779.76. As a consequence of the slightly greater increase in expenses, the net profit was $3,179.92 as compared with $4,493.34 the previous year, a decrease of $1,313.42. As your Association is not operated for profit, the fluctuations in your net earnings are of no great consequence, the important point being that your gross earnings show an increase of nearly 20 per cent, thus indicating that your Association is rendering greater service, thereby performing its functions in a manner more beneficial to the medical profession.

We have, as usual, found your books, accounts and records very neatly and carefully kept and consider that your Secretary-Manager, Mr. C. P. Loranz, and the office force working under his supervision are entitled to hearty commendation for their excellent work.

(Signed) FRANCIS B. LATADY & COMPANY,
Certified Public Accountants,
By FRANCIS B. LATADY, C. P. A.

Birmingham, Alabama, December 21, 1936.

In the event the change in the Constitution and By-Laws providing for Honorary Membership is approved at the General Session, the Secretary-Manager was authorized to pass to an honorary roster such names as he feels properly belong there under the section creating honorary membership.

The Secretary-Manager reported that the Woman's Auxiliary to the Southern Medical Association had very graciously agreed in the main to the change in their form of government as suggested by the Council last year, and that an organization plan satisfactory to the Auxiliary and to the Secretary-Manager had been adopted by the Auxiliary.

The Council instructed the Secretary-Manager to convey to the immediate Past-President, Dr. H. Marshall Taylor, Jacksonville, Florida, sympathy in the illness of Mrs. Taylor, which prevented his attendance upon this meeting.

The Council, speaking for the Association, expresses to the Baltimore City Medical Society, the Medical and Chirurgical Faculty of Maryland, the hotels, the press and the radio broadcasting stations of Baltimore and to all others who have con-

BALANCE SHEET

Balance Sheet, Southern Medical Association, Fiscal Year Ending October 31, 1936 (November 1, 1935, to October 31, 1936).

Surplus			$21,114.38
U. S. Government Bonds		$15,156.40	
Furniture and Fixtures		2,768.84	
Profit and Loss		424.20	
Revenue			
Interest on Bonds and Savings	$ 375.00		
Paper Stock Profit	1,212.18		
Advertising	16,872.92		
Dues	24,825.65		
Subscription	1,446.86		
Reprints	306.36		
Exhibits	17,810.00		
Interest and Discount	534.50—		63,383.47
Expense			
Publishing	15,511.94		
Cuts and Electros	2,387.87		
Journal Wrappers	506.85		
Second Class Postage	1,225.00		
Office Postage	2,969.81		
Salary	17,412.00		
Stationery and Printing	5,127.49		
Office Supplies and Expense	611.99		
Telephone and Telegraph	469.74		
Office Rent	1,367.40		
Subscription Commissions	22.75		
Advertising Expense	451.10		
Addressograph Expense	58.50		
Traveling Expense	2,108.80		
Expense at St. Louis	8,119.94		
Banking Expense	30.38		
General Expense	1,279.69		
Section Secretaries' Expense	118.10—	59,779.35	
Accounts Receivable (owe us)		2,578.61	
Accounts Payable (we owe)			165.00
Cash		3,955.45	
		$84,662.85	$84,662.85

Revenue Accounts	$63,383.47
Expense Accounts	59,779.35
Gross Profit	3,604.12
Less Profit and Loss	424.20
Net Profit for year ending Oct. 31, 1936	3,179.92

SURPLUS ACCOUNT

Surplus, October 31, 1935	$21,631.63
Honorarium to C. P. Loranz, authorized at St. Louis meeting, November 20, 1935, chargeable to Surplus	517.25
Surplus, November 20, 1935	$21,114.38
Net Profit for year ending October 31, 1936	3,179.92
Surplus, October 31, 1936	$24,294.30

STATEMENT OF ASSETS AND LIABILITIES
October 31, 1936

Assets

U. S. Government Bonds	$15,156.40
Furniture and Fixtures (net)	2,768.84
Accounts Receivable (owe us)	2,578.61
Cash	3,955.45
	$24,459.30

Liabilities

Surplus	$24,294.30
Accounts Payable (we owe)	165.00
	$24,459.30

MEMBERSHIP BY STATES

The following is a comparative statement of the membership of the Southern Medical Association for the past six years:

	1931	1932	1933	1934	1935	1936
Alabama	568	500	470	513	458	466
Arkansas	226	217	175	220	202	219
District of Columbia	163	161	149	157	154	173
Florida	512	401	346	404	372	355
Georgia	634	506	424	502	524	506
Kentucky	518	455	331	228	332	345
Louisiana	529	546	445	419	443	420
Maryland	285	271	251	252	245	482
Mississippi	445	419	335	345	333	297
Missouri	234	228	191	199	419	521
North Carolina	386	343	307	375	365	402
Oklahoma	254	247	207	236	258	262
South Carolina	245	203	182	204	185	193
Tennessee	575	515	421	464	459	471
Texas	816	724	587	944	1160	1102
Virginia	316	292	310	402	382	384
West Virginia	198	162	140	185	183	211
Other States and Foreign	104	137	86	83	93	102
Totals	7008	6327	5357	6132	6567	6911

tributed so much to the success of the meeting in this city, their sincere appreciation for the hospitality extended to us while guests in Baltimore. It is the opinion of the Council that this, the Baltimore meeting, has been one of the best in the history of the Association. Those who are in attendance have enjoyed the sincere hospitality of the profession and feel that a great measure of credit for the success of the meeting is due to the interest manifested by the local profession and by the citizens of Baltimore.

The Council proceeded to the election of three Trustees for the term of two years each, the terms of Dr. Hugh S. Cumming, Dr. Lewis J. Moorman and Dr. Hugh Leslie Moore expiring with this meeting. According to precedent, Dr. Hugh S. Cumming, oldest member in point of service, was retired, Dr. Moorman and Dr. Moore were reelected for a term of two years, and the outgoing President, Dr. Fred M. Hodges, was elected in place of Dr. Cumming.

The Council unanimously elected Dr. C. W. Dowden, Louisville, Kentucky, its Chairman for next year.

The Council adjourned as an executive body to meet in New Orleans, Louisiana, at the regular meeting of the Association in 1937. The Council convened as a Nominating Committee for the general officers of the Association, and these nominations will be presented to you later in the regular order of business.

(Signed) M. PINSON NEAL, *Chairman.*

It was moved the Report of the Council be adopted, was duly seconded, and carried without a dissenting vote.

AMENDMENTS TO THE CONSTITUTION

Dr. M. Pinson Neal, Columbia, Missouri, Chairman of the Council, read the amendments to the Constitution presented last year, laid on the table until this annual meeting, and now before the Association for final action.

It is recommended that Article 3 of the Constitution, subhead Membership, be changed so as to create three types of members, which shall be limited to members of the white race and shall be designated as follows: (1) Members; (2) Honorary Members; and (3) Associate Members. As amended, Article 3 of the Constitution shall read as follows:

Section 1. *Members.* The membership of this Association shall be limited to the white members of the various state and local medical societies of the following states, viz: Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky Louisiana, Maryland, Mississippi, Missouri, North Carolina

Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia; to white medical officers of the United States Army, Navy, Public Health Service and Veterans' Bureau, and to white American members of the Canal Zone Medical Association.

Section 2. *Honorary Members.* An active member of this Association who has been a member for a period of not less than ten consecutive years and who is an honorary member of his component society and of his constituent association, or who by reason of ill health or physical disability, or who because of eminence attained in the profession, may at the discretion of the Council be recommended for honorary membership. Such honorary members shall have all the rights and privileges of membership except that they may not hold office nor shall they be required to pay dues.

Section 3. *Associate Members.* The Council may recommend to Associate membership: (1) a layman who in their judgment has rendered meritorious service to the medical profession or to humanity, or (2) a member who has moved from the territory of the Southern Medical Association. An Associate member may not hold office, have voice in the affairs of the Association, or be subject to the regular dues.

It is further recommended that Section 2 of Article 3 in the Constitution as it now reads shall become Section 3 of Article 5.

It was moved the amendments to the Constitution be adopted as read, was duly seconded, and carried without a dissenting vote.

REPORT OF NOMINATING COMMITTEE

Dr. M. Pinson Neal, Columbia, Missouri, Chairman of the Nominating Committee, presented the report of the Committee.

The Council, as your Nominating Committee, presents for your consideration the following:

For President: Dr. Frank K. Boland, Atlanta, Georgia.

For First Vice-President: Dr. Sydney R. Miller, Baltimore, Maryland.

For Second Vice-President: Dr. Lea A. Riely, Oklahoma City, Oklahoma.

For Secretary, Treasurer and General Manager, carrying the title of Secretary-Manager: Mr. C. P. Loranz, for a term of five years.

Your Editor, Dr. M. Y. Dabney, and Associate Editor, Mrs. Eugenia B. Dabney, were elected two years ago for three years.

(Signed) M. PINSON NEAL, *Chairman.*

It was moved the Report of the Nominating Committee be received and the nominees elected by acclamation. The motion was duly seconded and carried without a dissenting vote. The President, Dr. Hodges, declared the nominees duly elected.

Dr. Frank K. Boland, Atlanta, Georgia, the newly elected President of the Southern Medical Association, was escorted to the platform and introduced by Dr. Hodges. Dr. Boland, in accepting the Presidency, said:

November seems to be a good month for happy presidential elections. I have not heard whether the other president intends to accept his office, but I wish to announce that I accept this office, and do so with a profound and sincere sense of appreciation and gratitude. It is a great honor to follow in the footsteps of so many distinguished predecessors.

I have always loved the Southern Medical Association, and have witnessed with gratification its progress during the past thirty years, from a small society to the magnificent organization we have today. I feel that it is not only an organization of the highest scientific attainments, but it also typifies two splendid characteristics for which our southland is celebrated—cordiality and good fellowship.

I am so glad we are now meeting in Baltimore, beautiful, historic, hospitable Baltimore, one of the great medical centers of our country. I always recall with pleasure the profitable three years I spent here as an intern and hospital resident.

I had occasion some time ago to say that if I have ever accomplished anything in life, I owe at least 51 per cent of it to the little lady in green sitting in the back of the hall. I wish to repeat this statement tonight. A friend recently sent me some verses along this line, ending with the thought, "I owe everything to my wife; and boy, does she collect it!"

I hope to see you all, and more besides, in New Orleans in 1937. Thank you from the bottom of my heart!

Dr. Sydney R. Miller, Baltimore, Maryland, newly elected First Vice-President, and Mr. C. P. Loranz, Birmingham, Alabama, reelected Secretary, Treasurer and General Manager, were escorted to the platform and introduced by Dr. Hodges. The newly elected Second Vice-President, Dr. Lea A. Riely, Oklahoma City, Oklahoma, was not present.

After announcements by the General Chairman, the General Session adjourned, and with the completion of the programs by the sections in session Thursday and until noon Friday, the Association adjourned to meet in New Orleans, Louisiana, November 30--December 1-2-3, 1937.

SCIENTIFIC AWARDS

The Committee on Scientific Awards presented the following report:

We, your Committee on Scientific Awards, visited the scientific exhibits, went over them very carefully, and make the following report:

First award to Dr. Deryl Hart, Dr. Paul W. Sanger and Dr. John Devine, Duke University School of Medicine, Durham, North Carolina, for their exhibit on sterilization of the air in the operating room by bactericidal radiant energy.

Second award to Dr. Joseph M. Hill and (Mr.) Lewis Waters, Baylor University College of Medicine, Dallas, Texas, for their exhibit on hematopoiesis and the mechanism of pathologic changes in the blood picture.

Third award to Dr. George B. Lawson, Roanoke, Virginia, for his exhibit on growth of tubercle bacilli on various media.

Honorable mention to:

Dr. G. V. Brindley, Dr. M. W. Sherwood, Dr. A. C. Scott, Jr., and Dr. Charles Phillips, Temple, Texas, for their exhibit on cancer of the rectum.

Wilmer Institute, Johns Hopkins University School of Medicine, Baltimore, Maryland, for their exhibit on photography and art in ophthalmology.

Dr. Dean Lewis and Dr. Charles F. Geschickter, Johns Hopkins University School of Medicine, Baltimore, Maryland, for their exhibit on endocrine studies in breast tumors.

Dr. Roy R. Kracke and Hortense Garver, Emory University School of Medicine, Emory University, Georgia, for their exhibit on blood dyscrasias.

There were so many excellent exhibits this year that the Committee found it very difficult to choose the outstanding ones.

(Signed) I. A. BIGGER, *Chairman,*
WILLIAM B. PORTER,
GEORGE T. CALDWELL,
Committee.

The Committee on Scientific Awards consists each year of the Chairman of the Section on Surgery, the Chairman of the Section on Medicine and the Chairman of the Section on Pathology. Dr. I. A. Bigger, as Chairman of the Section on Surgery, was Chairman of the Committee; Dr. William B. Porter was Chairman of the Section on Medicine; and Dr. George T. Caldwell was Chairman of the Section on Pathology.

GOLF TOURNAMENTS

Dr. Edward H. Richardson, Baltimore, Maryland, Chairman of the Golf Committee, makes the following report for his Committee:

The sixteenth annual golf tournament for men of the Southern Medical Association was held at Baltimore, Maryland, Roland Park Course of the Baltimore Country Club, play being made any time during Tuesday, Wednesday and Thursday, November 17, 18 and 19.

Dr. Arthur M. Alden, St. Louis, Missouri, won the tournament for low gross, senior class, with a score, gross 89, handicap 8, net 81, receiving the Ralston Purina Cup, the major trophy in the low gross, senior class, tournament.

Dr. Robert M. Harris, Miami, Florida, won the tournament for low gross, junior class, with a score, gross 84, handicap 4, net 80, receiving the *Washington Post* Cup, the major trophy in the low gross, junior class, tournament.

Dr. Benjamin M. Baker, Jr., Baltimore, Maryland, was the runner-up in the low gross, junior class, with a score, gross 85, handicap 5, net 80, receiving for the second time in succession the Schwarzschild Cup, the major trophy for the runner-up in the low gross, junior class, tournament.

Dr. Stuart W. Egerton, Baltimore, Maryland, won the handicap tournament for low net, junior class, with a score, gross 86, handicap 7, net 79, receiving the *Dallas Morning News* Cup, the major trophy in the low net, junior class, tournament.

Dr. M. M. Cullom, Nashville, Tennessee, won the trophy for low net, senior class, with a score, gross 96, handicap 17, net 79.

Dr. Harry D. McCarty, Baltimore, Maryland, and Dr. Reginald D. West, Baltimore, Maryland, tied for second place for low gross, senior class, with a score, gross 95, handicap 9, net 86, both receiving a trophy in this event.

Dr. Benjamin M. Baker Jr., Baltimore, Maryland, and Dr. Robert M. Harris, Miami, Florida, tied for second place in the tournament for low net, junior class. Dr. Baker with a score of gross 85, handicap 5, net 80, and Dr. Harris with a score of gross 84, handicap 4, net 80, the tie to be played off later in Florida.

Dr. Edward Clay Mitchell, Memphis, Tennessee, won the trophy in the tournament for the highest score, 104 gross.

The eleventh annual tournament for women was to have been held at the Elkridge Country Club, Charles Street Avenue, on Friday, November 20, at 9:30. On account of the unfavorable weather no ladies took part in the tournament.

The Dick X-ray Cup, won by Mrs. J. Lewis Hutton, St. Louis, Missouri, the trophy for low gross, will remain in the possession of Mrs. Hutton until next year.

The *Washington Post* Cup, the *Dallas Morning News* Cup, the Schwarzschild Cup and the Ralston Purina Cup, all for men, and the Dick X-Ray Cup for women, must be won three times in succession by the same golfer to become the permanent possession of any one golfer. No one having won any of these trophies three times in succession, they will all be in play at the tournament next year.

In spite of unfavorable weather conditions, twenty-three members participated in the golf tournament for men.

(Signed) EDWARD H. RICHARDSON, *Chairman.*

TRAP SHOOTING TOURNAMENT

Dr. J. M. T. Finney, Jr., Baltimore, Maryland, Chairman of the Trap Shooting Committee, makes the following report for his Committee:

The eleventh annual trap shooting tournament of the Southern Medical Association was held over the traps of the Oriole Gun Club, Baltimore, Maryland, under the auspices of the Baltimore City Medical Society, Wednesday, November 18, at 1:00 p. m.

Dr. William A. Sinton, Baltimore, Maryland, the high man on 100-16 yard targets, straight trap, won a leg on the *Atlanta Journal* Bowl, the major trophy for this event.

Dr. Robert P. Bay, Baltimore, Maryland, the high man on skeet, 50 targets, won a leg on the Sharp & Dohme Bowl, a new major trophy beginning this year for this event.

Dr. William A. Sinton, Baltimore, Maryland, high man in the high over all, 100-16 yard targets, straight trap, and 50 skeet, won a leg on the Mallinckrodt Bowl, the major trophy in this event.

Dr. Robert L. Mason, Roanoke, Virginia, high man in Class A, 100-16 yard targets, straight trap, won the prize for this event.

Dr. J. C. Wynkoop, Washington, D. C., high man in Class B, 100-16 yard targets, straight trap, won the prize for this event.

Dr. Robert P. Bay, Baltimore, Maryland, high man in Class C, 100-16 yard targets, straight trap, won the prize for this event.

Dr. J. M. Reese, Baltimore, Maryland, high man in Class A skeet, 50 targets, won the prize for this event.

Dr. A. C. Webster, Baltimore, Maryland, the high man in Class B skeet, 50 targets, won the prize for this event.

Dr. J. C. Derr, Frederick, Maryland, the high man in Class C skeet, 50 targets, won the prize for this event.

Owing to the small number taking part in the tournament, no prizes were awarded as originally contemplated to the runners-up in Classes A, B and C, straight trap and skeet.

The *Atlanta Journal* Bowl, the Sharp & Dohme Bowl, and the Mallinckrodt Bowl must each be won three times in succession by the same shooter to be the permanent possession of any one shooter. No one having won these trophies three times in succession, they will be in competition at the tournament shoot again next year.

The Committee extends thanks to the donors of the trophies and prizes and to the Oriole Gun Club.

(Signed) J. M. T. FINNEY, JR., *Chairman.*

RADIO BROADCASTS

Two of the Radio Broadcasting Stations of Baltimore cooperated with the Southern Medical Association in connection with the Baltimore meeting and the Association was on the air for the following programs:

Monday, November 16

Station W B A L, 7:00-7:15 p. m., "The Southern Medical Association," Dr. Sidney R. Miller, Baltimore, Maryland.

Tuesday, November 17

Station W F B R, 5:00-5:15 p. m., "Baltimore Welcomes the Southern Medical Association," Dr. Chas. C. W. Judd, Baltimore, Maryland.

Wednesday, November 18

Station W B A L, 4:30-4:45 p. m., "Dr. Walter Reed: A Martyr to Scientific Medicine," Dr. Earl Baldwin McKinley, Washington, D. C.

Station W F B R, 4:30-4:45 p. m., "The Maryland Department of Public Health: What It Does for the Public," Dr. Robert H. Riley, Baltimore, Maryland.

Station W F B R, 7:45-8:00 p. m., "Protecting the Public Through Drug Regulation," Dr. Robert L. Swain, Baltimore, Maryland.

Station W B A L, 8:30-8:45 p. m., "Public Health is a Special Branch of Medical Practice," Dr. Huntington Williams, Baltimore, Maryland.

Thursday, November 19

Station W B A L, 8:30-8:45 p. m., "How to Save Babies," Dr. J. H. Mason Knox, Baltimore, Maryland.

Station W B A L, 4:45-5:00 p. m., "Guarding the Health of Baltimore Since 1797," Dr. William H. F. Warthen, Baltimore, Maryland.

Station W F B R, 1:00-1:15 p. m., "The Three C's of Mouth Hygiene," Dr. R. C. Leonard, Baltimore, Maryland.

Station W F B R, 4:30-4:45 p. m., "Keeping Children Under Three Years Old Away from Whooping Cough and Measles," Dr. Adolph Weinzirl, Baltimore, Maryland.

Station W B A L, 1:00-1:30 p. m., "Presentation of Walter Reed Medals," Dr. J. F. Siler, Colonel, Medical Corps, U. S. Army, Washington, D. C., and Dr. Richard P. Strong, Harvard University Medical School, Boston, Massachusetts.

Friday, November 20

Station W F B R, 4:00-4:15 p. m., "Diphtheria Can Be Prevented," Dr. George Hemmeter, Baltimore, Maryland.

WOMEN PHYSICIANS OF THE SOUTHERN MEDICAL ASSOCIATION

Tuesday, November 17, 7:30 p. m.

The twenty-third annual meeting of the Women Physicians of the Southern Medical Association was held in a private dining room of The Longfellow, 2 West Madison Street, Baltimore, Maryland, Tuesday, November 17, at 7:30 p. m. Dr. Pauline Williams, Richmond, Virginia, Chairman of the Women Physicians of the Southern Medical Association, presided.

The address of the evening was given by Dr. Esther Loring Richards, Associate Professor of Psychiatry of the Johns Hopkins University School of Medicine, Baltimore, Maryland. Sixty women physicians attended the meeting and dinner.

Officers elected for the coming year were: Chairman, Dr. Leta J. White, Petersburg, Virginia; Vice-Chairman, Dr. Regina C. Beck, Richmond, Virginia; Secretary, Dr. Edna S. Pennington, Nashville, Tennessee; and Historian, Dr. Lillian H. South, Louisville, Kentucky.

The women physicians of Maryland gave a luncheon Thursday, November 19, to visiting women physicians, fifty being present.

Dr. Bessie L. Moses, Baltimore, was local Chairman for Women Physicians.

STATE PRESIDENTS' CONFERENCE

The Presidents and Presidents-Elect of the state medical associations in the South, of the states comprising the Southern Medical Association, had a get-together dinner meeting in connection with the annual meeting of the Southern Medical Association at Baltimore, Tuesday evening, November 17, at 7:00 o'clock, in a private dining room of the Lord Baltimore Hotel. Dr. Harvey F. Garrison, Jackson, Mississippi, President of the Mississippi State Medical Association, developed the idea of having such a meeting and extended the invitations, acting as the convener of the meeting.

All the Presidents and Presidents-Elect of the states comprising the Southern Medical Association were invited to this get-together dinner meeting, held for the purpose of an exchange of ideas, for an informal round table on matters of mutual interest. In extending the invitation the President and President-Elect were each requested to appoint some outstanding physician from his state to represent him in the event he could not personally attend. Sixteen of the seventeen states comprising the Southern Medical Association were represented by their President, their President and President-Elect, or by a representative of one or both of them. The group was the guest of the Southern Medical Association for the dinner.

Dr. Garrison as convener called the meeting to order and was unanimously elected Chairman, and Dr. Leon S. Lippincott, Vicksburg, Mississippi, representing the President-Elect of the Mississippi State Medical Association, was elected Secretary for this meeting.

Mr. C. P. Loranz, Birmingham, Alabama, Secretary-Manager of the Southern Medical Association, extended to the group the official greetings and welcome of the Association.

A splendid program had been arranged for this meeting, there being discussed subjects of interest to all having any responsibility in connection with organized medicine.

Dr. C. E. Waller, Washington, D. C., Assistant Surgeon General, United States Public Health Service, spoke on the subject, "The Effect of the Social Security Act on the Practice of Medicine in the South," the general discussion being opened by Dr. J. C. Vinson, Tampa, Florida, representing the President of the Florida State Medical Association. In his remarks Dr. Waller discussed in considerable detail the advantages which the expansion of public health work presents to the physician in private practice through the increased demand for medical service created by educational work, school medical inspections, campaigns for immunization, the referring of patients from prenatal, well baby, preschool and tuberculosis clinics and the like. He emphasized the fact that the public health program being carried out under the provisions of the Social Security Act is not a medical care program, except in the few instances in which treatment of the indigent may be the only means of controlling a communicable disease, and pointed out that the planning of the program in each state has been left to the discretion of the state health authorities, so long as the plans submitted were scientifically sound and gave promise of adequate return on the investment. The administration of the work, he said, is entirely in the hands of the state and local health authorities. He also stated that the Public Health Service, in considering the problem of medical care for the poor, has had in mind no program that would disturb the present method of practice of medicine in this country.

Dr. Frederick D. Chappelear, Hughesville, Maryland, President of the Medical and Chirurgical Faculty of the State of Maryland, spoke on the subject, "The Work of the Medical-Dental Service Bureau in Baltimore."

Dr. Seale Harris, Birmingham, Alabama, a past President of the Southern Medical Association, spoke on the subject, "The Probable Effect of Hospital Insurance on the Practice of Medicine in the South," the general discussion being opened by Dr. Ross A. Woolsey, St. Louis, Missouri, President of the Missouri State Medical Association. In discussing this subject Dr. Harris stated that in his opinion certain types of hospital insurance, under the absolute control of the medical profession, might be all right, but there was at least some potential danger to the legitimate practice of medicine in any hospital insurance scheme.

Dr. Edward H. Cary, Dallas, Texas, a past President of both the Southern Medical and the American Medical Associations, spoke on the subject, "The Best Means of Increasing Membership and Enthusiasm of a State Medical Association," the general discussion being opened by Dr. C. F. Strosnider, Goldsboro, North Carolina, President of the Medical Society of the State of North Carolina. Dr. Cary spoke helpfully and authoritatively on his subject.

Dr. Felix J. Underwood, Jackson, Mississippi, Health Officer of Mississippi, and a past President of both the Southern Medical and the Mississippi State Medical Associations, spoke on the subject, "The Value of Medical Organization," the general discussion being opened by Dr. B. H. Minchew, Waycross, Georgia, President of the Georgia State Medical Association. In his remarks Dr. Underwood brought out some pertinent points on the value of medical organization.

There was so much enthusiasm and interest, the meeting was so enjoyable and profitable, that adjournment was not taken until after midnight.

The group present was of the opinion that a conference such as this is well worth while, that it furnishes a splendid avenue of approach to the medical profession throughout the South, and should be an annual affair in connection with the Southern Medical Association meetings. A motion to this effect was made and unanimously carried. Dr. Garrison had the thanks of the group for developing the idea of having such a conference and for calling it into being.

The Conference elected Dr. Arthur M. Shipley, Baltimore Maryland, President-Elect of the Medical and Chirurgical Faculty of the State of Maryland, Chairman of the Conference for next year.

The Conference then adjourned *sine die*.

SCIENTIFIC AND TECHNICAL EXHIBITS

The Scientific and Technical Exhibits in connection with the thirtieth annual meeting of the Southern Medical Association were all placed on the Drill Floor of the Fifth Regiment Armory, Baltimore, Maryland, and were open on Tuesday, Wednesday and Thursday, November 17, 18 and 19 from 8:00 a. m. to 6:00 p. m., and on Friday, November 20, from 8:00 a. m. to 1:00 p. m.

There were one hundred and eleven (111) Scientific Exhibits representing all phases of medicine and surgery, many of them being original research work. The Scientific Exhibits were conveniently placed and arranged so they could be easily seen and studied. The preliminary program of the Scientific Exhibits appeared on pages 1121-1123 of the November 1936 JOURNAL, and the complete program, with the exception of three additional exhibits added at the meeting, on pages 15-23 of the official program.

In the Technical Exhibits there were one hundred and fourteen (114) business firms with a total of one hundred and fifty-two exhibit spaces. A partial list of the business firms with the exhibit diagram appeared on pages 1142-1143 of the November 1936 JOURNAL, and the complete list on pages 119-120 of the official program.

The Scientific and Technical Exhibits at the Baltimore meeting were the largest in the history of the Association.

REGISTRATION

Baltimore Meeting, Southern Medical Association, November 17-20, 1936

	Number Physicians	Number Ladies Accompanying Physicians
Alabama	76	32
Arkansas	19	7
District of Columbia	292	33
Florida	86	29
Georgia	163	46
Kentucky	65	24
Louisiana	52	21
Maryland (Outside of Baltimore)	201	37
Baltimore	847	....
Mississippi	38	19
Missouri	52	17
North Carolina	198	46
Oklahoma	27	11
South Carolina	77	26
Tennessee	121	37
Texas	72	25
Virginia	285	78
West Virginia	104	41
Total from So. Med. Assn. states	2775	529
Pennsylvania	125	16
New York	101	7
New Jersey	42	4
Massachusetts	30	2
Delaware	21	2
Connecticut	11	1
Other States	84	20
Foreign	23	—
Total Physicians	3212	581
Medical Students	660	
With Technical Exhibits	375	
Association Office and Miscell.	51	
	4298	
Ladies	581	
Grand Total	4879	

These figures are compiled from the card registration. There is always a number of physicians attending who neglect to register. The number who attend and fail to register is variously estimated from 5 to 15 per cent of the total registration. It is believed that at least 5 per cent of the physicians who attended the Baltimore meeting failed to register, and if this be true an additional 160 physicians should be added to the 3,212 who did register, making the actual attendance apparently at least 3,372 physicians, with a grand total of 5,039.

MOVING PICTURES

Wednesday, November 18, 9:00 a. m. to 5:30 p. m.

Fifth Regiment Armory, Assembly Room No. 10

9:00-10:00 a. m.—Request period. Any film on program was run at this time upon request to the movie operator.

10:00 a. m. to 12:15 p. m.—These films were run in this order:

"The Underwater Treatment of Arthritis," Dr. W. T. Wootton, Hot Springs National Park, Arkansas.

(1) "Surgery of the Kidney" and (2) "Surgery of the Bladder," Dr. Robert B. McIver, Jacksonville, Fla.

(1) "Anastomosis of Gastro-Intestinal Tract" and (2) "Ureteral Transplantation and Cystectomy," Dr. Addison G. Brenizer, Charlotte, North Carolina.

"Surgery of the Ureter," Dr. Robert B. McIver, Jacksonville, Florida.

"Fifty Fractures of Neck of Femur Treated Immediately with Smith-Petersen Nail," Dr. Lawson Thornton and Dr. Calvin Sandison, Emory University School of Medicine, Atlanta, Georgia.

"Examination, Protection and Treatment of Convalescent Poliomyelitis," Dr. Raymond E. Lenhard and (Mr.) Henry O. Kendall, Children's Hospital School, Baltimore, Maryland.

"Occupational Therapy," Sheppard and Enoch Pratt Hospital, Occupational Therapy Department, Towson, Maryland.

12:15-2:00 p. m.—Request period. Any film on program was run at this time upon request to the movie operator.

2:00-4:45 p. m.—These films were run in this order:

"Technic of Roentgen Kymography," Dr. Wendell G. Scott and Dr. Sherwood Moore, Washington University School of Medicine, St. Louis, Missouri.

"The Hematocrit Technic as an Aid in Routine Practice," Dr. M. M. Wintrobe, Johns Hopkins Hospital, Baltimore, Maryland.

"The Orthoptic Treatment of Squint," Dr. William Thornwall Davis, George Washington University School of Medicine, Washington, D. C.

"Ophthalmological Operations," Dr. Alan C. Woods, Wilmer Institute, Johns Hopkins Hospital, Baltimore, Maryland.

(1) "Bronchoscopy, Removal of Foreign Bodies," (2) "Laryngoscopy for Cancer of the Larynx," and (3) "The Use of Bronchoscopy in Diagnosis and Treatment," Dr. Edward A Looper, University of Maryland School of Medicine, Baltimore, Maryland.

"Seeing Through Life," Maryland Society for the Prevention of Blindness, Baltimore, Maryland.

"The Modern Diagnosis and Treatment of Syphilis," American Social Hygiene Association, New York, New York.

4:45-5:30 p. m.—Request period. Any film on program was run at this time upon request to the movie operator.

Wednesday, November 18, 9:00 a. m. to 5:30 p. m.

Fifth Regiment Armory, Assembly Room No. 11

9:00-10:00 a. m.—Request period. Any film on program was run at this time upon request to the movie operator.

10:00 a. m. to 12:30 p. m.—These films were run in this order:

(1) "Subtotal Thyroidectomy for Exophthalmic Goiter," and (2) "Total Thyroidectomy for Nodular Toxic Goiter," Dr. David Henry Poer, Emory University School of Medicine, Atlanta, Georgia.

"Aseptic Intestinal Anastomosis," Dr. Cyrus F. Horine, University of Maryland School of Medicine, Baltimore, Maryland.

"Embryological Development of Generative Tract," Dr. J Mason Hundley, Jr., Baltimore, Maryland. (Film obtained from the Obstetrical and Gynecological Department of the Royal Infirmary, Liverpool, England.)

"The Treatment of Gonorrhea in the Female by Means of Systemic and Additional Pelvic Heating," Dr. William Bierman and Dr. E. A. Horowitz, Mount Sinai Hospital, New York, New York.

"Causes and Treatment of Leukorrhea," Dr. Karl John Karnaky, University of Texas School of Medicine (Galveston) and Jefferson Davis Hospital, Houston, Texas.

"An Operation for Transvaginal Sterilization," Dr. Howard Owen Smith, Marlin, Texas.

12:30-2:00 p. m.—Request period. Any film on program was run at this time upon request to the movie operator.

2:00-4:30 p. m.—These films were run in this order:

"Outline of Treatment of Burns," Dr. J. D. Martin, Jr., Emory University School of Medicine, Atlanta, Georgia.

"Technic of Electrosurgical Operation for Advanced Carcinoma," Dr. Tibor de Cholnoky, Postgraduate Medical School and Hospital, Columbia University, New York, New York.

"Cancer of the Rectum," Dr. G. V. Brindley, Dr. M. W. Sherwood, Dr. A. C. Scott, Jr., and Dr. Charles Phillips, Temple, Texas.

"Selective Thoracoplasty," Dr. C. B. Carter, Baylor University College of Medicine, Dallas, Texas.

"The Surgery of Pulmonary Tuberculosis," Dr. Kenneth A. Morris, Jacksonville, Florida.

"Physics of Electrosurgery and Electrosurgical Operations," Dr. Grant E. Ward, University of Maryland School of Medicine, Baltimore, Maryland.

"Open Treatment of General Peritonitis," Dr. H. A. Gamble, Greenville, Mississippi.

4:30-5:30 p. m.—Request period. Any film on program was run at this time upon request to the movie operator.

Thursday, November 18

Same program as Wednesday.

HOSPITAL CLINICS

Friday Afternoon, November 20

The official activities of the Southern Medical Association closed at noon on Friday. Friday afternoon there were unofficial clinic sessions, wardwalks and operative clinics held at Johns Hopkins Hospital and University of Maryland Hospital. The complete program of these sessions, wardwalks and operative clinics was given in two issues of the *Daily Bulletin* published during the Baltimore meeting.

GENERAL CLINICAL SESSIONS

BALTIMORE DAY

Tuesday, November 17, 10:00 a. m.

A Clinical Session, Medicine—Section A, was held at the Fifth Regiment Armory, Assembly Room No. 1, Baltimore, Dr. Julius Friendenwald, Baltimore, presiding.

The following presentations were made:

Dr. Harry M. Stein, Professor of Clinical Medicine, University of Maryland School of Medicine, Baltimore: "Artificial Pneumothorax in Pneumonia" (Lantern Slides).

Dr. Charles R. Austrian, Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore: "Bronchiectasis" (Lantern Slides).

Dr. Thomas R. Boggs, Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore: "Fungus Infections of the Lung" (Lantern Slides).

Dr. Walter A. Baetjer, Associate Professor of Medicine, University of Maryland School of Medicine, and Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore: "The Significance of Precordial Pain."

Dr. Henry M. Thomas, Jr., Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore: "Cause and Treatment of Functional Disability in Emphysema" (Lantern Slides).

Dr. Frank R. Ford, Associate Professor of Neurology, Johns Hopkins University School of Medicine, Baltimore: "The Function of the Vestibulo-Ocular Reflexes."

Dr. Paul W. Clough, Associate Professor of Medicine, University of Maryland School of Medicine, and Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore: "Dietary Deficiencies as a Cause of Anemia."

Dr. M. M. Wintrobe, Associate in Medicine, Johns Hopkins University School of Medicine, Dr. Edward M. Hanrahan, Jr., Instructor in Surgery, Johns Hopkins University School of Medicine, and Instructor in Surgery, University of Maryland School of Medicine, and Dr. Caroline Bedell Thomas, Instructor in Medicine, Johns Hopkins University School of Medicine, Baltimore: "Thrombocytopenic Purpura" (Lantern Slides).

The Session adjourned until 2:00 p. m.

Tuesday, November 17, 2:00 p. m.

The Clinical Session reconvened in the Fifth Regiment Armory, Assembly Room No. 1, Dr. Thomas B. Futcher, Baltimore, presiding.

The following presentations were made:

Dr. William S. Love, Jr., Associate Professor of Medicine and Instructor in Pathology, University of Maryland School of Medicine, Baltimore: "Electrocardiograms Simulating those of Coronary Thrombosis" (Lantern Slides).

Dr. Perrin H. Long, Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore: "Prontosil, a Specific Chemotherapeutic Agent for the Treatment of Beta Hemolytic Streptococcal Infections" (Lantern Slides).

Dr. Charles W. Wainwright, Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore: "Mellitensis Infection: Treatment with Neoarsphenamine" (Lantern Slides).

Dr. Warfield T. Longcope, Professor of Medicine, Johns Hopkins University School of Medicine, and Director of Department of Medicine, Johns Hopkins Hospital, Baltimore: "Pyelonephritis" (Lantern Slides).

Dr. Magnus I. Gregerson, Professor of Physiology, University of Maryland School of Medicine, Baltimore: "Administration of Fluids: Effect of Blood Volume" (Lantern Slides).

Dr. Maurice C. Pincoffs, Professor of Medicine, University of Maryland School of Medicine, Baltimore: "Varieties of Hypertension" (Lantern Slides).

Dr. Louis Hamman, Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore: "Subacute Gonococcal Endocarditis."

Dr. Hugh R. Spencer, Professor of Pathology, University of Maryland School of Medicine, Baltimore: "Congenital Polycystic Disease of the Kidney" (Lantern Slides).

Dr. Lloyd W. Ketron, Associate Professor of Dermatology, Johns Hopkins University School of Medicine, Baltimore: "Skin Disease and Internal Medicine."

The Session then adjourned *sine die*.

GENERAL CLINICAL SESSIONS

BALTIMORE DAY

Tuesday, November 17, 10:00 a. m.

A Clinical Session, Medicine—Section B, was held at the Fifth Regiment Armory, Assembly Room No. 2, Baltimore, Dr. Harvey G. Beck, Baltimore, presiding.

The following presentations were made:

Dr. Thomas P. Sprunt, Associate Professor of Medicine, University of Maryland School of Medicine, and Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore: "Recalcification of Bone after Removal of Parathyroid Adenoma" (Lantern Slides).

Dr. Thomas B. Futcher, Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore: "Disturbances of Pituitary Function" (Lantern Slides).

Dr. George A. Harrop, Associate Professor of Medicine, Johns Hopkins University School of Medicine, and Dr. M. Richard Whitehill, Baltimore: "Protamine Insulin" (Lantern Slides).

Dr. Eduard Uhlenhuth, Professor of Anatomy, University of Maryland School of Medicine, Baltimore: "Interrelations between Thyroid and Hypophysis" (Lantern Slides).

Dr. John T. King, Jr., Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore: "Etiology of Exophthalmic Goiter" (Lantern Slides).

Dr. E. Cowles Andrus, Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore: "The Heart in Thyroid Disease" (Lantern Slides).

Dr. Lewellys F. Barker, Professor Emeritus of Medicine, Johns Hopkins University School of Medicine, Baltimore: "Management of Psychoneurotic Patients."

Dr. Ross McC. Chapman, Professor of Psychiatry, University of Maryland School of Medicine, Baltimore: "Changes in Psychiatric Education."

The Session adjourned until 2:00 p. m.

Tuesday, November 17, 2:00 p. m.

The Clinical Session reconvened in the Fifth Regiment Armory, Assembly Room No. 2, Dr. Lewellys F. Barker, Baltimore, presiding.

The following presentations were made:

Dr. Edwards A. Park, Professor of Pediatrics, and Director of Department of Pediatrics, Johns Hopkins University School of Medicine, Baltimore: "Craniotabes" (Lantern Slides).

Dr. Huntington Williams, Professor of Hygiene and Public Health, University of Maryland School of Medicine, Baltimore: "The Prevention of Deaths from Measles."

Dr. T. Campbell Goodwin, Associate Professor of Pediatrics, University of Maryland School of Medicine, and Associate in Pediatrics, Johns Hopkins University School of Medicine, Baltimore: "Cardiac Decompensation in Acute Nephritis in Childhood."

Dr. Alan M. Chesney, Associate Professor of Medicine and Dean of the Medical School, Johns Hopkins University School of Medicine, Baltimore: "Syphilis as a Problem in Immunity."

Dr. J. Earle Moore, Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore: "The Treatment of Asymptomatic Neurosyphilis" (Lantern Slides).

Dr. Julius Friedenwald, Professor Emeritus of Gastroenterology, University of Maryland School of Medicine, Baltimore: "Acute and Chronic Pancreatitis: Clinical Observations" (Lantern Slides).

Dr. Thomas R. Brown, Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore: "Neoplasms of the Digestive Tract."

Dr. Harvey G. Beck, Professor of Clinical Medicine, University of Maryland School of Medicine, Baltimore: "Chronic Carbon Monoxide Anoxemia: Clinical Syndromes."

Dr. James G. Arnold, Jr., Instructor in Neurology and Assistant in Pathology, University of Maryland School of Medicine, Baltimore: "Clinical Picture of Craniopharyngiomas" (Lantern Slides).

The Session then adjourned *sine die*.

GENERAL CLINICAL SESSIONS

BALTIMORE DAY

Tuesday, November 17, 10:00 a. m.

A Clinical Session, Surgery—Section A, was held at the Fifth Regiment Armory, Assembly Room No. 3, Baltimore, Dr. Walter D. Wise Baltimore presiding.

The following presentations were made:

Dr. Waitman F. Zinn, Clinical Professor of Diseases of the Nose and Throat, University of Maryland School of Medicine, Baltimore: "Carcinoma of the Esophagus" (Lantern Slides).

Dr. J. Staige Davis, Associate Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore: "A Method of Tubed Flap Formation" (Lantern Slides).

Dr. J. Mason Hundley, Jr., Professor of Gynecology, University of Maryland School of Medicine, Baltimore: "Physiological Changes Occurring in the Urinary Tract During Pregnancy with Special Consideration of Associated Pyelitis" (Lantern Slides).

Dr. J. M. T. Finney, Sr., Professor Emeritus of Surgery, Johns Hopkins University School of Medicine, Baltimore: "The Acute Abdomen."

Dr. Walter D. Wise, Professor of Clinical Surgery, University of Maryland School of Medicine, Baltimore: "Complications of Advanced Biliary Tract Disease."

Dr. Robert P. Bay, Professor of Oral Surgery, University of Maryland School of Medicine, Baltimore: "Ankylosis of the Jaw" (Lantern Slides).

Dr. George E. Bennett, Associate Professor of Orthopedic Surgery, Johns Hopkins University School of Medicine, Baltimore: "Old Dislocations of the Shoulder" (Lantern Slides).

Dr. I. Ridgeway Trimble, Instructor in Surgery, Johns Hopkins University School of Medicine, Baltimore: "The Prevention and the Treatment of Surgical Shock."

The Session adjourned until 2:00 p. m.

Tuesday, November 17, 2:00 p. m.

The Clinical Session reconvened in the Fifth Regiment Armory, Assembly Room No. 3, Dr. Richard W. TeLinde, Baltimore, presiding.

The following presentations were made:

Dr. Samuel McLanahan, Jr., Assistant in Surgery, Johns Hopkins University School of Medicine, Baltimore: "One-Stage Abdomino-Perineal Resection for Carcinoma of the Rectum" (Lantern Slides).

Dr. Charles Bagley, Jr., Professor of Neurologic Surgery, University of Maryland School of Medicine, Baltimore: "The Initial Treatment of Patients with Acute Cerebral Injuries" (Lantern Slides).

Dr. Harvey B. Stone, Associate Professor of Surgery, Johns Hopkins University School of Medicine, and Dr. James C Owings, Associate in Surgery, Johns Hopkins University School of Medicine, Baltimore: "The Treatment of Acute Mechanical Intestinal Obstruction."

Dr. Warfield M. Firor, Associate Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore: "Adrenal Lesions in Children" (Lantern Slides).

Dr. Charles Reid Edwards, Professor of Clinical Surgery, University of Maryland School of Medicine, Baltimore: "Late Intestinal Obstruction Complicating Acute Appendicitis: Its Management" (Lantern Slides).

Dr. Lawrence R. Wharton, Instructor in Gynecology, Johns Hopkins University School of Medicine, Baltimore: "The Signs of Ovulation in Women."

Dr. Page Edmunds, Professor of Traumatic Surgery, University of Maryland School of Medicine, Baltimore: "Fractures and Physiotherapy" (Lantern Slides).

Dr. Hugh H. Young, Professor of Urology, Johns Hopkins University School of Medicine, Baltimore: "Remarks on Surgery of the Prostate" (Lantern Slides).

Dr. W. Houston Toulson, Professor of Genito-Urinary Surgery, University of Maryland School of Medicine, Baltimore: "Renal Infections" (Lantern Slides).

Dr. Richard G. Coblentz, Associate in Neurologic Surgery, University of Maryland School of Medicine, Baltimore: "Chronic Subdural Hematoma: Diagnosis and Treatment" (Lantern Slides).

Dr. Chas. W. Maxson, Chief, Department of Surgery, South Baltimore General Hospital, Baltimore: "Preoperative Preparation for Children." Owing to illness Dr. Maxson's paper was read for him by Dr. James S. Webb.

The Session then adjourned *sine die*.

GENERAL CLINICAL SESSIONS

BALTIMORE DAY

Tuesday, November 17, 10:00 a. m.

A Clinical Session, Surgery—Section B, was held at the Fifth Regiment Armory, Assembly Room No. 4, Baltimore, Dr. J. M. T. Finney, Jr., presiding.

The following presentations were made:

Dr. Franklin F. Snyder, Associate Professor of Obstetrics, Johns Hopkins University School of Medicine, Baltimore: "Apnea of the New Born" (Moving Pictures).

Dr. Edward H. Richardson, Associate Professor of Gynecology, Johns Hopkins University School of Medicine, Baltimore: "A Useful Modification of the Watkins' Interposition Operation" (Lantern Slides).

Dr. Walter E. Dandy, Adjunct Professor of Neurological Surgery, Johns Hopkins University School of Medicine, Baltimore: "Meniere's Disease: Its Diagnosis and Treatment" (Lantern Slides).

Dr. Thomas B. Aycock, Associate in Surgery, University of Maryland School of Medicine, Baltimore: "The Anatomy and Physiology of the Sympathetics in Relation to the Treatment of Hypertension" (Lantern Slides).

Dr. Arthur M. Shipley, Professor of Surgery and Head of the Department, University of Maryland School of Medicine, Baltimore: "The Surgical Treatment of Hypertension."

Dr. William F. Rienhoff, Jr., Associate Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore: "The Surgical Treatment of Common Duct Stones" (Lantern Slides).

Dr. Monte Edwards, Associate Professor of Surgery, University of Maryland School of Medicine, Baltimore: "The Management of the Anorectal Syndrome of Lymphogranuloma Inguinale."

Dr. Allen F. Voshell, Professor of Orthopedic Surgery, University of Maryland School of Medicine, Baltimore: "Diathermy in Delayed Union of Fractures" (Lantern Slides).

The Session adjourned until 2:00 p. m.

Tuesday, November 17, 2:00 p. m.

The Clinical Session reconvened in the Fifth Regiment Armory, Assembly Room No. 4, Dr. Frank S. Lynn, Baltimore, presiding.

The following presentations were made:

Dr. Grant E. Ward, Associate in Surgery, University of Maryland School of Medicine, Baltimore: "The Management of Accessible Malignant Disease" (Lantern Slides).

Dr. Louis H. Douglass, Professor of Clinical Obstetrics, University of Maryland School of Medicine, Baltimore: "Postpartum Hemorrhage."

Dr. Dean Lewis, Professor of Surgery and Director of the Department, Johns Hopkins University School of Medicine Baltimore: "Differential Diagnosis of Bone Lesions" (Lantern Slides).

Dr. Thomas K. Galvin, Assistant Professor of Gynecology, University of Maryland School of Medicine, Baltimore: "Unusual Postoperative Infection with Progressive Ulceration."

Dr. Frank S. Lynn, Professor of Clinical Surgery, University of Maryland School of Medicine, Baltimore: "The Surgical Consideration of the Typhoid Carrier" (Lantern Slides).

Dr. George A. Stewart, Instructor in Surgery, Johns Hopkins University School of Medicine, Baltimore: "Tumors of the Chest Wall" (Lantern Slides).

Dr. Thomas S. Cullen, Professor of Gynecology, Johns Hopkins University School of Medicine, Baltimore: "Hemorrhage into or Beneath the Rectus Muscle Simulating an Acute Abdomen" (Lantern Slides).

Dr. Nathan Winslow, Professor of Clinical Surgery, University of Maryland School of Medicine, Baltimore: "Suppurative Pericarditis."

Dr. Bertram M. Bernheim, Associate Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore: "Diagnosis and Treatment of Peripheral Vascular Diseases Becoming Unnecessarily Complicated and Confused."

Dr. Daniel J. Pessagno, Associate Professor of Surgery, University of Maryland School of Medicine, Baltimore: "Regional Ileitis with Involvement of the Cecum."

Dr. Barnes Woodhall, Instructor in Surgery, Johns Hopkins University School of Medicine, Baltimore: "Surgical Treatment of the Hemophiliac" (Lantern Slides).

The Session then adjourned *sine die*.

GENERAL CLINICAL SESSIONS

BALTIMORE DAY

Tuesday, November 17, 10:00 a. m.

A Clinical Session, Ophthalmology and Otolaryngology, was held at the Fifth Regiment Armory, Assembly Room No. 5, Baltimore, Dr. Alan C. Woods, Baltimore, presiding.

The following presentations were made:

OPHTHALMOLOGY

Dr. Frank B. Walsh, Associate in Ophthalmology, Johns Hopkins University School of Medicine, Baltimore: "The Clinical Picture and Classification of Glaucoma" (Lantern Slides).

Dr. Jonas S. Friedenwald, Associate Professor of Ophthalmology, Johns Hopkins University School of Medicine, Baltimore: "The Pathology of Glaucoma" (Lantern Slides).

Dr. Clyde A. Clapp, Professor of Ophthalmology, University of Maryland School of Medicine, Baltimore: "The Medical Treatment of Glaucoma" (Lantern Slides).

Dr. Alan C. Woods, Acting Professor of Ophthalmology and Acting Director of Department of Ophthalmology, Johns Hopkins University School of Medicine, Baltimore: "The Surgical Treatment of Glaucoma" (Lantern Slides).

Dr. Edward P. Burch, Instructor in Ophthalmology, Johns Hopkins University School of Medicine, Baltimore: "The Result of Surgical Treatment of Glaucoma."

Dr. Louise Sloan, Instructor in Ophthalmology, Johns Hopkins University School of Medicine, Baltimore: "Perimetrical Studies in Syphilitic Atrophy of the Optic Nerve" (Lantern Slides).

Dr. H. Hanford Hopkins, Instructor in Medicine, Johns Hopkins University School of Medicine, Baltimore: "The Modern Treatment of Syphilitic Atrophy of the Optic Nerve" (Lantern Slides).

The Session adjourned until 2:00 p. m.

Tuesday, November 17, 2:00 p. m.

The Clinical Session reconvened in the Fifth Regiment Armory, Assembly Room No. 5, Dr. Edward A. Looper, Baltimore, presiding.

The following presentations were made:

OTOLARYNGOLOGY

Dr. Edwin N. Broyles, Associate in Laryngology and Otology, Johns Hopkins University School of Medicine, Baltimore: "The Diagnosis of Tumors of the Lower Respiratory Tract" (Lantern Slides).

Dr. Lee Cohen, Otolaryngologist to Baltimore Eye, Ear, Nose and Throat Hospital and Sinai Hospital, Baltimore: "Correction of Depressed Deformities of the External Nose with Rib-Graft" (Lantern Slides).

Dr. Jesse W. Downey, Jr., Professor of Otology, University of Maryland School of Medicine, Baltimore: "A Study of the Infant Temporal Bone: The Anatomy of Its Middle Ear Tract and Its Disease" (Lantern Slides and Specimens).

Dr. Stacy R. Guild, Associate Professor of Otology and Director of Otological Research Laboratory, Johns Hopkins University School of Medicine, Baltimore: "Anatomical Variations of the Petrous Pyramid and Their Influence upon the Clinical Symptoms of Infection in this Region" (Lantern Slides).

Dr. J. Julian Chisholm, Associate in Laryngology and Otology, Johns Hopkins University School of Medicine, Baltimore: "Clinical Aspects of Petrous Pyramid Infection" (Lantern Slides).

Dr. Joseph I. Kemler, Associate in Ophthalmology, University of Maryland School of Medicine, Baltimore: "Implantation in Ozena" (Lantern Slides).

Dr. Edward A. Looper, Professor of Diseases of the Nose and Throat, University of Maryland School of Medicine, Baltimore: "Laryngectomy for Cancer of the Larynx" (Moving Pictures).

Dr. W. Raymond McKenzie, Associate in Diseases of the Nose and Throat, University of Maryland School of Medicine, Baltimore: "Chronic Sinusitis: A Complete Operation: Technic and Results in Two Hundred Consecutive Cases" (Lantern Slides).

Dr. Harry R. Slack, Jr., Associate in Laryngology and Otology, Johns Hopkins University School of Medicine, Baltimore: "The Diagnosis and Treatment of Conditions Simulating Sinus Disease" (Lantern Slides).

Dr. Moses L. Breitstein, Instructor in Laryngology and Otology, Johns Hopkins University School of Medicine, Baltimore: "The Proper Criteria for Lip Reading Recommendation: Medical and Educational Considerations."

The Session then adjourned *sine die*.

GENERAL CLINICAL SESSIONS

TWO SESSIONS MEETING CONCURRENTLY REPRESENTING ALL SPECIALTIES

Wednesday, November 18, 9:15 a. m.

Fifth Regiment Armory, Assembly Room No. 1, Baltimore, Dr. Fred M. Hodges, President, Richmond, Virginia, and Dr. Quitman U. Newell, First Vice-President, St. Louis, Missouri, presiding.

The following presentations were made:

Dr. William H. Stewart, New York, New York: "A Preliminary Report on Cine-Fluorography" (Moving Pictures).

Dr. Quitman U. Newell, Professor of Clinical Obstetrics and Gynecology, Washington University School of Medicine, and Dr. W. C. Scrivener, St. Louis, Missouri: "The Morbidity and Mortality in Supravaginal Versus Complete Hysterectomy" (Lantern Slides).

Dr. Fred W. Rankin, Lexington, Kentucky: "Common Errors in the Diagnosis and Treatment of Cancer of the Colon and Rectum."

Dr. Wm. deB. MacNider, Kenan Research Professor of Pharmacology, University of North Carolina School of Medicine, Chapel Hill, North Carolina: "The Acquired Resistance of Fixed Tissue Cells to Certain Chemical Poisons" (Lantern Slides).

Dr. Willis F. Manges, Professor of Roentgenology, Jefferson Medical College, Philadelphia, Pennsylvania: "The Roentgen Treatment of Infections" (Lantern Slides).

Dr. S. A. Cosgrove, Clinical Professor of Obstetrics, Faculty of Medicine, Columbia University (New York), Jersey City, New Jersey: "Obstetric Hemorrhage and Its Management" (Lantern Slides).

Dr. William E. Ladd, Clinical Professor of Surgery, Harvard University Medical School, Boston, Massachusetts: "Duplications of the Alimentary Tract" (Lantern Slides).

Dr. C. C. Coleman, Professor of Neurological Surgery, Medical College of Virginia, Richmond, Virginia: "The Management of Acute Head Injuries."

The Session then adjourned *sine die*.

Wednesday, November 18, 9:15 a. m.

Fifth Regiment Armory, Assembly Room No. 2, Baltimore, Dr. Fred M. Hodges, President, Richmond, Virginia, and Dr. J. E. Knighton, Second Vice-President, Shreveport, Louisiana, presiding.

The following presentations were made:

Dr. A. A. Herold, Shreveport, Louisiana: "Evaluation of Modern Therapy in Diabetes Mellitus."

Dr. Charles Hendee Smith, Professor of Pediatrics, New York University College of Medicine, New York, New York: "The Diet of Young Infants" (Lantern Slides).

Dr. Russell L. Cecil, Professor of Clinical Medicine, Cornell University Medical College, and Professor of Internal Medicine, New York Polyclinic Medical School and Hospital, New York, New York: "Phenomena which Accompany the Very Early Administration of Antipneumococcus Serum in Lobar Pneumonia."

Dr. B. R. Kirklin, Professor of Radiology, University of Minnesota Graduate School of Medicine, and Chief of the Department of Radiology, Mayo Clinic, Rochester, Minnesota: "Clinical Indications for Roentgenologic Examination of the Thorax" (Lantern Slides).

Dr. O. H. Perry Pepper, Professor of Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania: "Comments on Diseases of the Esophagus" (Lantern Slides).

Dr. W. S. Newcomet, Philadelphia, Pennsylvania: "The Treatment of Angiomata with Radium" (Lantern Slides).

Dr. Alphonse McMahon, Senior Instructor in Medicine, St. Louis University School of Medicine, St. Louis, Missouri: "Relation of Thyrotoxicosis to Emotions."

Dr. William H. Stewart, New York, New York: "A Preliminary Report on Cine-Fluorography" (Moving Pictures).

The Session then adjourned *sine die*.

SECTION ON MEDICINE

Officers

Chairman—Dr. William B. Porter, Richmond, Virginia.
Vice-Chairman—Dr. O. P. J. Falk, St. Louis, Missouri.
Secretary—Dr. John B. Youmans, Nashville, Tennessee.

Wednesday, November 18, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 1, Baltimore, Maryland, and was called to order by the Chairman, Dr. William B. Porter, Richmond, Virginia, who presided.

Dr. Conley H. Sanford, Memphis, Tennessee, read a paper entitled "Drainage as a Factor in the Treatment of Lobar Pneumonia" (Lantern Slides), which was discussed by Dr. John Minor, Washington, D. C., and Dr. Henry M. Thomas, Baltimore, Maryland.

The Chairman appointed the following Nominating Committee: Dr. Maurice C. Pincoffs, Baltimore, Maryland; Dr. Paul H. Ringer, Asheville, North Carolina; and Dr. J. E. Knighton, Shreveport, Louisiana.

Dr. William B. Porter, Richmond, Virginia, read his Chairman's Address entitled "The Heart in Endemic Pellagra" (Lantern Slides).

Paper by Dr. Julian M. Ruffin and Dr. David T. Smith, Durham, North Carolina, entitled "A Clinical Evaluation of the Potency of Various Extracts of Liver in the Treatment of Pellagra" (Lantern Slides), was read by Dr. Ruffin, and was discussed by Dr. Maurice C. Pincoffs, Baltimore, Maryland, and Dr. Henry E. Mulholland, University, Virginia.

Paper by Dr. Virgil P. Sydenstricker and Dr. John W Thomas, Augusta, Georgia, entitled "Some Factors in the Etiology of Pellagra," was read by Dr. Sydenstricker, and was discussed by Dr. Frederic M. Hanes, Durham, North Carolina, and Dr. Leon S. Lippincott, Vicksburg, Mississippi.

Paper by Dr. Tom D. Spies, Cincinnati, Ohio, Dr. Austin Chinn, Washington, D. C., and Dr. James B. McLester, Birmingham, Alabama, entitled "The Treatment of Endemic Pellagra" (Lantern Slides), was read by Dr. McLester, and was discussed by Dr. James E. Paullin, Atlanta, Georgia, and Dr. W. H. Sebrell, Washington, D. C.

Dr. W. T. Wootton, Hot Springs National Park, Arkansas, read a paper entitled "The Spa Treatment of Chronic Arthritis" (Moving Pictures), which was discussed by Dr. J. Albert Key, St. Louis, Missouri, and Dr. Charles N. Wainwright, Baltimore, Maryland.

The Section then adjourned until 2:00 p. m. Thursday.

Thursday, November 19, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 1, Baltimore, Maryland, and was called to order by the Chairman, Dr. Porter, who presided.

It was moved and carried that the papers be opened to general discussion.

Dr. Francis M. Duffy, Enid, Oklahoma, read a paper entitled "Fusospirochaetal Infection of the Lungs," which was discussed by Dr. David T. Smith, Durham, North Carolina; Dr. Lewis J. Moorman, Oklahoma City, Oklahoma; and in closing by the essayist.

Paper by Dr. C. Sidney Burwell, Boston, Massachusetts, entitled "The Influence of Pregnancy on the Course of Heart Disease," in the absence of Dr. Burwell due to illness, was read by the Secretary.

Dr. Wm. Groce Harrison, Jr., Birmingham, Alabama, read a paper entitled "Clinical Studies in Venous Pressure and Their Significance" (Lantern Slides), which was discussed by Dr Warfield T. Longcope, Baltimore, Maryland.

Dr. Joseph H. Cannon, Charleston, South Carolina, read a paper entitled "Pulmonary Embolism with Special Reference to the Acute Cor Pulmonale: Report of a Case" (Lantern Slides), which was discussed by Dr. Louis Hamman, Baltimore, Maryland, and in closing by the essayist.

Dr. Isidore S. Kahn, San Antonio, Texas, read a paper entitled "The Relief of Chronic Intractable Bronchial Asthma by Intentionally Induced Ether Anesthesia" (Lantern Slides), which was discussed by Dr. Walter L. Winkenwerder, Baltimore, Maryland, and Dr. John B. Youmans, Nashville, Tennessee.

The Nominating Committee reported the following nominations for Section officers the nominees being duly elected by vote of the Section:

Chairman—Dr. Chas. Hartwell Cocke, Asheville, North Carolina.
Vice-Chairman—Dr. Henry G. Rudner, Memphis, Tennessee.
Secretary—Dr. John B. Youmans, Nashville, Tennessee.

The Section then adjourned *sine die.*

SECTION ON PEDIATRICS

Officers

Chairman—Dr. M. Hines Roberts, Atlanta, Georgia.
Vice-Chairman—Dr. Theodore C. Hempelmann, St. Louis, Missouri.
Secretary—Dr. Hughes Kennedy, Jr., Birmingham, Alabama.

Thursday, November 19, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 1, Baltimore, Maryland, and was called to order by the Chairman, Dr. M. Hines Roberts, Atlanta, Georgia, who presided.

Dr. Henry Dwight Chapin, Emeritus Professor of Pediatrics, New York Post Graduate Medical School, Columbia University, New York, New York, was introduced and made some remarks on breast feeding.

Dr. Joseph Yampolsky, Atlanta, Georgia, read a paper entitled "A Comparative Study of the Use of Stovarsol and Stovarsol with Bismuth in Syphilis in Children" (Lantern Slides), which was discussed by Dr. Frank R. Smith, Jr., Baltimore, Maryland, and Dr. D. Lesesne Smith, Jr., Spartanburg, South Carolina.

Dr. James S. Plant, Newark, New Jersey, read a paper entitled "A Psychiatrist's View of the Problem of Prevention in Pediatrics."

Dr. M. Hines Roberts, Atlanta, Georgia, read his Chairman's Address entitled "A Study of Mastoid Infection in Children" (Lantern Slides).

The Chairman appointed the following committee to prepare Resolutions on the death of Dr. W. McKim Marriott, San Francisco, California, formerly of St. Louis, Missouri, a past Chairman of this Section and a past member of the Council of the Southern Medical Association: Dr. Alexius F. Hartmann, St. Louis, Missouri; Dr. J. Buren Sidbury, Wilmington, North Carolina; and Dr. Theodore C. Hempelmann, St. Louis, Missouri.

Dr. Alexis F. Hartmann, St. Louis, Missouri, read a paper entitled "Thrombophlebitis of the Lateral Sinus Secondary to Mastoiditis" (Lantern Slides), which was discussed by Dr. John J. Shea, Memphis, Tennessee.

Dr. H. Earle Conwell, Birmingham, Alabama, read a paper entitled "Acute Osteomyelitis in Childhood: Diagnosis and Treatment" (Lantern Slides), which was discussed by Dr. Oliver W. Hill, Knoxville, Tennessee, and Dr. Robert W. Johnson, Jr. Baltimore, Maryland.

Dr. J. Buren Sidbury, Wilmington, North Carolina, read a paper entitled "Tuberculosis in Childhood" (Lantern Slides), which was discussed by Dr. Miriam E. Brailey, Baltimore, Maryland, and Dr. P. P. McCain, Sanatorium, North Carolina.

The Chairman appointed the following Nominating Committee: Dr. Hugh L. Dwyer, Kansas City, Missouri; Dr. Oliver W. Hill, Knoxville, Tennessee; and Dr. Luther W. Holloway, Jacksonville, Florida.

The Section then adjourned until 9:00 a. m. Friday.

Friday, November 20, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 1, Baltimore, Maryland, and was called to order by the Chairman, Dr. Roberts, who presided.

Dr. Hugh L. Dwyer, Kansas City, Missouri, read a paper entitled "Experiences with Liberal Carbohydrate Diets in Diabetic Children" (Lantern Slides), which was discussed by Dr. Claude M. Burpee, Augusta, Georgia, and Dr. T. Cook Smith, Louisville, Kentucky.

Dr. Joseph S. Wall, Washington, D. C., read a paper entitled "Interstitial Bronchopneumonia in Children" (Lantern Slides) which was discussed by Dr. Eugene R. Whitmore, Washington, D. C., and Dr. Edwards A. Park, Baltimore, Maryland.

Dr. W. W. Waddell, Jr., University, Virginia, read a paper entitled "Premature Infants: A Clinical Study of 432 Infants Born Prematurely" (Lantern Slides), which was discussed by Dr. Amos Christie, Baltimore, Maryland, and Dr. Angus M McBryde, Durham, North Carolina.

The Committee to prepare resolutions on the death of Dr. W. McKim Marriott presented the following report which was unanimously adopted, ordered spread on the minutes of the Section, and a copy sent to the family of the deceased:

> WHEREAS, W. McKim Marriott, born and reared in Chapel Hill, North Carolina, during his lifetime achieved so eminent a position the world over as a pediatrist, as a teacher and as a leader in medical research and thought, that he came to be one of the South's most distinguished representatives in the medical world;
>
> THEREFORE, BE IT RESOLVED, That this Section go on record in expressing its great respect for and appreciation of his lifetime of service, its admiration and love for him personally, and its profound sorrow at his passing.

Dr. Samuel F. Ravenel, Greensboro, North Carolina, read a paper entitled "Anterior Pituitary Insufficiency (Simmond's Disease): Report of a Case with Recovery" (Lantern Slides).

Dr. Warren W. Quillian, Coral Gables, Florida, read a paper entitled "Fasciola Hepatica (Liver Fluke) and Human Infestation."

Dr. Angus M. McBryde, Durham, North Carolina, read a paper entitled "Tetanus Immunization with Alum Precipitated Toxoid" (Lantern Slides), which was discussed by Dr. D. C. Wharton Smith, Baltimore, Maryland, and Dr. Francis F. Schwentker, Baltimore, Maryland.

Dr. Ralph Bowen, Oklahoma City, Oklahoma, read a paper entitled "Some Practical Diagnostic and Therapeutic Procedures in Asthmatic Children" (Lantern Slides), which was discussed by Dr. Eugene Rosamond, Memphis, Tennessee, and Dr. W. Ambrose McGee, Richmond, Virginia.

The Section, by motion duly carried, expressed its thanks to the local pediatrists for their hospitality.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Gilbert J. Levy, Memphis, Tennessee.
Vice-Chairman—Dr. D. C. Wharton Smith, Baltimore, Maryland.
Secretary—Dr. Hughes Kennedy, Jr., Birmingham, Alabama.

The Section then adjourned *sine die.*

SECTION ON GASTROENTEROLOGY

Officers

Chairman—Dr. James Alto Ward, Birmingham, Alabama.
Vice-Chairman—Dr. Lay Martin, Baltimore, Maryland.
Secretary—Dr. Harry Eldridge Murry, Texarkana, Arkansas-Texas.

Thursday, November 19, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 4, Baltimore, Maryland, and was called to order by the Chairman, Dr. James Alto Ward, who read his Chariman's Address entitled "Obesity and Its Management."

Dr. Martin E. Rehfuss, Philadelphia, Pennsylvania, read a paper entitled "Surgery Versus Medicine in the Handling of Chronic Gallbladder Disease."

Dr. Walter R. Johnson, Asheville, North Carolina, read a paper entitled "The Differential Diagnosis of Painless Jaundice" (Lantern Slides), which was discussed by Dr. Louis Hamman, Baltimore, Maryland, and Dr. Elbert L. Persons, Durham, North Carolina.

Paper by Dr. A. L. Levin and Dr. M. Shushan, New Orleans, Louisiana, entitled "Facts on Gallbladder Disease: An Evaluation of the Clinical and Radiologic Aspects in Seven Hundred and Thirty Cases" (Lantern Slides), was read by Dr. Levin, and was discussed by Dr. Julius Friedenwald, Baltimore, Maryland, and Dr. Seale Harris, Birmingham, Alabama.

Dr. James L. Borland, Jacksonville, Florida, read a paper entitled "The Present Status of Flexible Tube Gastroscopy" which was discussed by Dr. Rudolf Schindler, Chicago, Illinois; Dr. Elmer B. Freeman, Baltimore, Maryland; and Dr. Porter P. Vinson, Richmond, Virginia.

Dr. Arthur Camp Stanley, Washington, D. C., read a paper entitled "Cardiologic Significance of Epigastric Pain," which was discussed by Dr. Ernest H. Gaither, Baltimore, Maryland, and Dr. James Alexander Lyon, Washington, D. C.

The Chairman appointed the following Nominating Committee: Dr. Ernest H. Gaither, Baltimore, Maryland; Dr. Porter P. Vinson, Richmond, Virginia; and Dr. James L. Borland, Jacksonville, Florida.

The Section then adjourned until 9:00 a. m. Friday.

Friday, November 20, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 4, and was called to order by the Chairman, Dr. Ward.

Dr. Frank M. Acree, Greenville, Mississippi, read a paper entitled "Some Clinical Manifestations of Malaria with Reference to the Gastro-Intestinal Tract," which was discussed by Dr. Leon S. Lippincott, Vicksburg, Mississippi, and Dr. C. W. Dowden, Louisville, Kentucky.

Dr. Wm. Calvert Chaney, Memphis, Tennessee, read a paper entitled "The Relative Importance of Food Idiosyncrasy in Gastro-Intestinal Disease," which was discussed by Dr. Lay Martin, Baltimore, Maryland, and Dr. Julius Friedenwald, Baltimore Maryland.

Dr. Max L. Garon, Louisville, Kentucky, read a paper entitled "Chronic Ulcerative Colitis: A Case Report" (Lantern Slides), which was discussed by Dr. Moses Paulson, Baltimore, Maryland, and Dr. William J. Martin, Louisville, Kentucky.

Paper by Dr. Milford O. Rouse and Dr. Cecil O. Patterson, Dallas, Texas, entitled "The Clinical Significance of a Mobile Colon" (Lantern Slides and Moving Pictures), was read by Dr. Rouse, and was discussed by Dr. Andrew Small, Dallas, Texas, and Dr. W. F. Thornton, Lynchburg, Virginia.

Dr. Heinz G. Hummel, Little Rock, Arkansas, read a paper entitled "The Management of Chronic Relapsing Amebiasis," which was discussed by Dr. Chas. F. Craig, New Orleans, Louisiana, and Dr. Maurice C. Pincoffs, Baltimore, Maryland.

Dr. John Walker Morledge, Oklahoma City, Oklahoma, read a paper entitled "The Problem of Amebiasis as Seen in Oklahoma," which was discussed by Dr. Wm. C. Chaney, Memphis, Tennessee, and Dr. Virgil E. Simpson, Louisville, Kentucky.

Upon motion of Dr. Julius Friedenwald, seconded and carried, the Section created an Executive Committee to be composed of the three last chairmen of the Section, the oldest member in point of service being Chairman of the Committee. The Committee for next year will be: Dr. Ernest H. Gaither, Baltimore, Maryland, Chairman; Dr. Walter E. Vest, Huntington, West Virginia; and Dr. James Alto Ward, Birmingham, Alabama.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Harry Eldridge Murry, Texarkana, Arkansas-Texas.
Vice-Chairman—Dr. Fred W. Wilkerson, Montgomery, Alabama.
Secretary—Dr. Lay Martin, Baltimore, Maryland.

The Section then adjourned *sine die*.

SECTION ON PATHOLOGY

Officers

Chairman—Dr. George T. Caldwell, Dallas, Texas.
Vice-Chairman—Dr. Wiley D. Forbus, Durham, North Carolina.
Secretary—Dr. Roy R. Kracke, Emory University, Georgia.

Wednesday, November 18, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 6, Baltimore, Maryland, and was called to order by the Chairman, Dr. George T. Caldwell, Dallas, Texas, who read his Chairman's Address entitled "Histogenesis of Some of the More Common Types of Sarcomas."

Dr. Everett L. Bishop, Atlanta, Georgia, read a paper entitled "Adamantinoma of the Tibia" (Lantern Slides), which was discussed by Dr. Wiley D. Forbus, Durham, North Carolina, and Dr. Chas. F. Geschickter, Baltimore, Maryland.

Paper by Dr. James G. Dees and Dr. Harry C. Schmeisser, Memphis, Tennessee, entitled "Intracystic Papilloma and Papillocarcinoma of the Breast" (Lantern Slides), was read by Dr. Dees, and was discussed by Dr. D. J. Pessagno, Baltimore, Maryland.

The Chairman appointed the following Nominating Committee: Dr. Kenneth M. Lynch, Charleston, South Carolina; Dr. Eugene R. Whitman, Washington, D. C.; and Dr. Charles Phillips, Temple, Texas.

Dr. Charles Phillips, Temple, Texas, read a paper entitled "Abdominal Carcinomatosis, Krukenberg Tumor Type, with Case Report," which was discussed by Dr. Harry C. Schmeisser, Memphis, Tennessee, and in closing by the essayist.

Dr. Kenneth M. Lynch, Charleston, South Carolina, read a paper entitled "Primary Liver Carcinoma: Relation to Yellow Atrophy Cirrhosis" (Lantern Slides), which was discussed by Dr. Henry T. Collenberg, Baltimore, Maryland; Dr. Roger Choisser, Washington, D. C.; and Dr. Robert A. Keilty, Washington, D. C.

Dr. Ferdinand C. Helwig, Kansas City, Missouri, read a paper entitled "Histopathologic Studies of the Brain in Delayed Death Following Strangulation," which was discussed by Dr. Charles C. W. Judd, Baltimore, Maryland.

The Section then adjourned until 2:00 p. m. Thursday.

Thursday, November 19, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 6, Baltimore, Maryland, and was called to order by the Chairman, Dr. Caldwell, who presided.

Paper by Dr. Robert M. Moore and Dr. M. Pinson Neal, Columbia, Missouri, entitled "The Associated Incidence of Tuberculosis and Malignant Tumors: Special Reference to Intrathoracic Tuberculosis and Carcinoma of the Alimentary Canal," was read by Dr. Neal, and was discussed by Dr. Hugh R. Spencer, Baltimore, Maryland.

Dr. Esmond R. Long, Professor of Pathology, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania read a paper entitled "The Variability of Pulmonary Tuberculosis" (Lantern Slides).

Dr. Paul F. Dickens, Washington, D. C., read a paper entitled "Benign Lymphocytic Choriomeningitis," which was discussed by Dr. James W. Watts, Washington, D. C.; Dr. Charles Armstrong, Washington, D. C.; Dr. John W. Turner, Atlanta, Georgia; Dr. Charles Phillips, Temple, Texas; Dr. Lee Howard, Savannah, Georgia; and Dr. M. M. McLean, Washington, D. C.

Dr. Everett S. Sanderson, Augusta, Georgia, read a paper entitled "Cultivation of Hemophilus Ducrey and Preparation of an Antigen for Intracutaneous Diagnosis of Chancroidal Infection," which was discussed by Dr. Frank W. Hachtel, Baltimore, Maryland; Dr. David T. Smith, Durham, North Carolina; and Dr. E. von Haam, New Orleans, Louisiana.

Paper by Dr. Jos. R. Stevens and Dr. E. Lloyd Wilbur, Durham, North Carolina, entitled "Morbid Anatomic Changes Following Artificial Fever with Report of Autopsies," was read by Dr. Wilbur, and was discussed by Dr. Walter M. Simpson, Dayton, Ohio; Dr. Charles M. Carpenter, Rochester, New York; Dr. William Bierman, New York, New York; Dr. Harry C. Schmeisser, Memphis, Tennessee; and Dr. J. C. Wynkoop, Washington, D. C.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Wiley D. Forbus, Durham, North Carolina.
Vice-Chairman—Dr. Everett L. Bishop, Atlanta, Georgia.
Secretary—Dr. R. R. Kracke, Emory University, Georgia.

Dr. E. von Haam, New Orleans, Louisiana, invited the Conference of Southern Pathologists to meet at Louisiana State University next year.

The Section then adjourned *sine die*.

SECTION ON NEUROLOGY AND PSYCHIATRY

Officers

Chairman—Dr. Frank H. Redwood, Norfolk, Virginia.
Vice-Chairman—Dr. Lawrence F. Woolley, Towson, Maryland.
Secretary—Dr. Frank H. Luton, Nashville, Tennessee.

Thursday, November 19, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 6, Baltimore, Maryland, and was called to order by the Chairman, Dr. Frank H. Redwood, Norfolk, Virginia, who read his Chairman's Address entitled "A Discussion of Intracranial Hemorrhage."

Paper by Dr. Samuel S. Riven and Dr. Morton F. Mason, Nashville, Tennessee, entitled "The Treatment of Myasthenia Gravis" (Lantern Slides), was read by Dr. Riven, and was discussed by Dr. Frank R. Ford, Baltimore, Maryland; Dr. Raymond S. Crispell, Durham, North Carolina; and Questions by Dr. Walter J. Otis, New Orleans, Louisiana; Dr. James Greenwood, Houston, Texas; Dr. Esmond R. Long, Philadelphia, Pennsylvania; and in closing by Dr. Riven.

Paper by Dr. Abraham Myerson, Clinical Professor of Psychiatry, Harvard University Medical School, Boston, Massachusetts, entitled "Experimental Autonomic Pharmacology of the Human Being," was read by Dr. Julius Loman, Boston, Massachusetts, after which he was requested to present some clinical experiences.

Dr. Wm. Walter Young, Atlanta, Georgia, read a paper entitled "Mental Hygiene in Changing Times," which was discussed by Dr. Esther Loring Richards, Baltimore, Maryland; Dr. R. Finley Gayle, Richmond, Virginia; a question by Dr. Erwin Wexberg, New Orleans, Louisiana; and in closing by the essayist.

Paper by Dr. Frank H. Mayfield and Dr. R. Glen Spurling, Louisville, Kentucky, entitled "Brain Abscesses: A Review of Thirty-Two Surgical Cases," was read by Dr. Mayfield, and was discussed by Dr. Charles Bagley, Jr., Baltimore, Maryland; Dr. Harry Wilkins, Oklahoma City, Oklahoma; Dr. Jos. E. J. King, New York, New York; and in closing by Dr. Mayfield.

The Chairman appointed the following Nominating Committee: Dr. James Asa Shield, Richmond, Virginia; Dr. Walter J. Otis, New Orleans, Louisiana; and Dr. Edgar F. Fincher, Jr., Atlanta, Georgia.

The Section then adjourned until 9:00 a. m. Friday.

Friday, November 20, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 6, Baltimore, Maryland, and was called to order by the Chairman, Dr. Redwood, who presided.

Dr. Lloyd J. Thompson, Durham, North Carolina, read a paper entitled "Psychiatry in Southern Regions" (Lantern Slides), which was discussed by Dr. George H. Preston, Baltimore, Maryland; Dr. Frank H. Luton, Nashville, Tennessee; and in closing by the essayist.

Dr. David C. Wilson, University, Virginia, read a paper entitled "Clinical Manifestations of Virus Diseases of the Central Nervous System," which was discussed by Dr. Beverley R. Tucker, Richmond, Virginia; Dr. James W. Watts, Washington, D. C.; Dr. J. P. Leake, Washington, D. C.; a question by Dr. S. Spafford Ackerly, Louisville, Kentucky; and in closing by the essayist.

Dr. Erwin Wexburg, New Orleans, Louisiana, read a paper entitled "Diseases of the Nervous System from Nutritional Deficiency," which was discussed by Dr. Titus H. Harris, Galveston, Texas.

Paper by Dr. Walter Freeman and Dr. James W. Watts, Washington, D. C., entitled "Prefrontal Lobotomy in the Treatment of Mental Disorders," was read by Dr. Freeman, and was discussed by Dr. S. Spafford Ackerly, Louisville, Kentucky; Dr. Adolf Meyer, Baltimore, Maryland; questions by Dr. Walter J. Otis, New Orleans, Louisiana; and Dr. S. Spafford Ackerly, Louisville, Kentucky; and in closing by Dr. Freeman.

Dr. Sidney I. Schwab, St. Louis, Missouri, read a paper entitled "An Estimate of the Value of a Course in Psychobiology" (Lantern Slides), which was discussed by Dr. Adolf Meyer, Baltimore, Maryland.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Lawrence F. Woolley, Towson, Maryland.
Vice-Chairman—Dr. Frank H. Luton, Nashville, Tennessee.
Secretary—Dr. S. Spafford Ackerly, Louisville, Kentucky.

The Section then adjourned *sine die*.

SECTION ON RADIOLOGY

Officers

Chairman—Dr. Henry J. Walton, Baltimore, Maryland.
Vice-Chairman—Dr. James A. Meadows, Birmingham, Alabama.
Secretary—Dr. Roy G. Giles, Temple, Texas.

Wednesday, November 18, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 7, Baltimore, Maryland, and was called to order by the Chairman, Dr. Henry J. Walton, Baltimore, Maryland, who presided.

Dr. Harold G. F. Edwards, Shreveport, Louisiana, read a paper entitled "Roentgen Therapy in Skin Cancer," which was discussed by Dr. James M. Martin, Dallas, Texas; Dr. Fred M. Hodges, Richmond, Virginia; and in closing by the essayist.

Dr. Edwin C. Ernst, St. Louis, Missouri, read a paper entitled "What Does the Tumor Get?" which was discussed by Dr. Edwin A. Merritt, Washington, D. C.; Dr. Karl F. Kesmodel, Birmingham, Alabama; and in closing by the essayist.

Dr. Wm. Edward Chamberlain, Professor of Radiology and Roentgenology, Temple University School of Medicine, Philadelphia, Pennsylvania, read a paper entitled "The Protracted Fractional Method of Roentgen Therapy: Its Indications and Limitations."

Dr. Edwin A. Merritt, Washington, D. C., read a paper entitled "Radiation Therapy in Carcinoma of the Rectum" (Lantern Slides), which was discussed by Dr. Grant E. Ward, Baltimore, Maryland; and Dr. Harry A. Miller, Baltimore, Maryland.

Dr. Alexander R. MacKenzie, Huntington, West Virginia, read a paper entitled "Roentgen Ray Therapy in Fibrous Ankylosis of the Jaw," which was discussed by Dr. Max Kahn, Baltimore, Maryland; and in closing by the essayist.

Paper by Dr. Chas H. Heacock and Dr. Nicholas Gotton, Memphis, Tennessee, entitled "Roentgenologic Findings in Intracranial Lesions," was read by Dr. Heacock, and was discussed by Dr. Wm. Edward Chamberlain, Philadelphia, Pennsylvania; and in closing by Dr. Heacock.

The Chairman appointed the following Nominating Committee: Dr. Vincent W. Archer, Charlottesville, Virginia; Dr. J. C Dickinson, Tampa, Florida; and Dr. Karl F. Kesmodel, Birmingham, Alabama.

The Section then adjourned until 2:00 p. m. Thursday.

Thursday, November 19, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 7, Baltimore, Maryland, and was called to order by the Chairman, Dr. Henry J. Walton, Baltimore, Maryland, who read his Chairman's Address entitled "The Effect of Education upon Radiology."

Dr. John A. Beals, Greenville, Mississippi, read a paper entitled "Duodenal Diverticula: Special Reference to Late Filling," which was discussed by Dr. Chas. A. Waters, Baltimore, Maryland; Dr. Franklin B. Bogart, Chattanooga, Tennessee; and in closing by the essayist.

Paper by Dr. Robert H. Lafferty and Dr. Clyde C. Phillips, Charlotte, North Carolina, entitled "Pulmonary Changes in Some Patients Suffering from Malta Fever," was read by Dr. Phillips, and was discussed by Dr. F. H. Robinson, Washington, D. C.; Dr. Vincent W. Archer, University, Virginia; and Dr. Franklin B. Bogart, Chattanooga, Tennessee; and in closing by Dr. Phillips.

Paper by Dr. L. Whitley Diggs, Dr. H. N. Pulliam and Dr. J. Cash King, Memphis, Tennessee, entitled "Bone Changes in Sickle Cell Anemia" (Lantern Slides), was read by Dr. Diggs, and was discussed by Dr. Maxwell M. Wintrobe, Baltimore Maryland; Dr. John W. Pierson, Baltimore, Maryland; and in closing by Dr. Diggs.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. D. A. Rhinehart, Little Rock, Arkansas.
Vice-Chairman—Dr. Hunter B. Spencer, Lynchburg, Virginia.
Secretary—Dr. Roy G. Giles, Temple, Texas.

By motion of Dr. J. C. Dickinson, Tampa, Florida, which was duly carried, the Section expressed its thanks to the Baltimore men for their hospitality.

Dr. Charles H. Heacock, Memphis, Tennessee, moved, motion seconded and carried, that the Section officers be authorized to use their own judgment in taking up a collection from among the members of the Section to defray the expenses of invited guests.

The Section then adjourned *sine die*.

SECTION ON DERMATOLOGY AND SYPHILOLOGY

Officers

Chairman—Dr. Jack W. Jones, Atlanta, Georgia.
Vice-Chairman—Dr. Harry M. Robinson, Baltimore, Maryland.
Secretary—Dr. Winston U. Rutledge, Louisville, Kentucky.

Wednesday, November 18

The Section had a Clinic and Presentation of Cases at the University of Maryland Hospital Dispensary beginning at 11:00 a. m., followed by a luncheon at the University Hospital at 1:00 p. m., the Baltimore-Washington Dermatological Society being the host. Discussion of the presented cases began at 2:30 p. m. in Gordon Wilson Hall, University of Maryland Hospital.

The Section had its usual annual banquet, which was held at the Emerson Hotel at 7:00 p. m., Dr. Harry M. Robinson, Baltimore, presiding.

Thursday, November 19, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 7, Baltimore, Maryland, and was called to order by the Vice-Chairman, Dr. Harry M. Robinson, Baltimore, who presided in the absence of the Chairman, who was unavoidably prevented from attending the meeting.

The Chairman appointed the following Nominating Committee: Dr. Henry H. Hazen, Washington, D. C.; Dr. Dudley C. Smith, University, Virginia; and Dr. C. A. Andrews, Tampa, Florida.

It was moved, seconded and carried, that there be a free and open discussion of the papers presented, the time allowed for the discussions to be left to the discretion of the Chairman.

The Address of the Chairman, Dr. Jack W. Jones, Atlanta, Georgia, entitled "Autochemotherapy in Dermatology," was read by his associate, Dr. Herbert S. Alden.

Paper by Dr. Elmo D. French and Dr. Rothwell Lefholz, Miami, Florida, entitled "Lupus Vulgaris in the Far South' (Lantern Slides), was read by Dr. French, and was discussed by Dr. J. L. Kirby-Smith, Jacksonville, Florida; Dr. William F. Spiller, Galveston, Texas; Dr. C. Guy Lane, Boston, Massachusetts; and in closing by Dr. French.

Paper by Dr. Frank J. Eichenlaub and Dr. I. Lewis Sandler, Washington, D. C., entitled "A Case of Lipophagic Granuloma and Sclerema Neonatorum," was read by Dr. Eichenlaub, and was discussed by Dr. Thomas W. Murrell, Richmond, Virginia; Dr. M. T. Van Studdiford. New Orleans, Louisiana; Dr. Emmett R. Hall, Memphis, Tennessee; and in closing by the essayist.

Dr. C. Guy Lane, Boston, Massachusetts, read a paper entitled "Occupational Dermatoses: Their More Uniform Management" (Lantern Slides).

Dr. Charles O. King, Birmingham, Alabama, read a paper entitled "Radiation Therapy of Carbuncles," which was discussed by Dr. Wm. Howard Hailey, Atlanta, Georgia, and Dr. Carey C. Barrett, Lexington, Kentucky.

Dr. Robert L. Kelly, Louisville, Kentucky, read a paper entitled "Diagnosis and Treatment of Neoplasms of the Skin," which was discussed by Dr. Lee McCarthy, Washington, D. C., and Dr. Walter O. Teichmann, Washington, D. C.

Paper by Dr. James K. Howles and Dr. John H. Connell, New Orleans, Louisiana, entitled "Mycosis Fungoides" (Lantern Slides), was read by Dr. Howles, and was discussed by Dr. Winston U. Rutledge, Louisville, Kentucky, and Dr. John H. Connell, New Orleans, Louisiana.

The Section then adjourned until 9:00 a. m. Friday.

Friday, November 20, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 7, Baltimore, Maryland, and was called to order by the Vice-Chairman, Dr. Robinson, who presided.

It was moved and carried that the Section send flowers to Dr. Dudley C. Smith, University, Virginia, a member of the Section, who had sustained serious injury as a result of a fall the evening before, Dr. Smith being then at the Memorial Hospital, Baltimore. The flowers were taken to Dr. Smith by Dr. J. L. Kirby-Smith, Jacksonville, Florida.

It was moved and carried that a message of sympathy* be sent to Mrs. Jeffrey C. Michael, Houston, Texas, wife of the late Dr. Jeffrey C. Michael, a member and former Chairman of this Section, and that this expression of sympathy be spread upon the minutes of the Section.

Dr. J. Richard Allison, Columbia, South Carolina, read a paper entitled "Hyperglycemia in Skin Diseases," which was discussed by Dr. Isaac R. Pels, Baltimore, Maryland, and Dr. Frank J. Eichenlaub, Washington, D. C.

Dr. Clinton W. Lane, St. Louis, Missouri, read a paper entitled "Dermatomyositis" (Lantern Slides), which was discussed by Dr. Joseph E. Gately, Baltimore, Maryland.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Harry M. Robinson, Baltimore, Maryland.
Vice-Chairman—Dr. J. Richard Allison, Columbia, South Carolina.
Secretary—Dr. Winston U. Rutledge, Louisville, Kentucky.

Dr. Augustus H. Lancaster, Knoxville, Tennessee, read a paper entitled "Clematis Dermatitis," which was discussed by Dr. H. Ford Anderson, Washington, D. C.

---

*DR. JEFFREY C. MICHAEL

BE IT RESOLVED, That in the death of our dear friend and associate, Dr. Jeffrey C. Michael, Houston, Texas, a member and former Chairman of this Section, that the Section has lost one of its most distinguished members; and

BE IT FURTHER RESOLVED, That the following lines be spread upon the minutes of the Section and a copy sent to the members of Dr. Michael's family:

Doctors have been referred to as saviors of the world whom the Almighty has deigned to take unto His Council for the liberation of humanity and its many and varied ills, men whose mission is to relieve and never cause pain, men with kindness of heart, delicacy of feeling, thoughtfulness for others, unbounded, silent charity.

Men with natures nobly planned,
To rule, to comfort, to command.
Humble men who work and pray
And when duty calls, obey.

There seems to be wafted back to us from that farther and beautiful shore, the message of that great Soldier-Doctor, Colonel John McCrae, who was there to meet him:

"We are the dead, short days ago,
We lived, felt dawn, saw sunset glow,
Loved and were loved, and now we lie
In Flanders Fields.
Take up our quarrel with the foe,
To you from falling hands we throw
The torch; be yours to hold it high
If ye break faith with those who die,
We shall not sleep though poppies grow
In Flanders Fields."

"There is no heart that is not the sepulchre of one or more dead." Death is just the beginning. It is just another great adventure. When a great man dies, there is an after-glow that reaches far into the night. Our Master said: "I will strike the mighty oak in the desert and replace it with a fine young tree."

"There is no death—the stars go down
To rise upon another shore.
And bright in heaven's jeweled crown
They shine forevermore.
Death is beautiful,
Death is dawn,
The waking from a fevered night
Unto beauty, peace and light."

Dr. Samuel F. Rosen, Savannah, Georgia, read a paper entitled "Unusual Reaction from Typhoid Vaccine Given Intravenously in a Case of Psoriasis" (Lantern Slides), which was discussed by Dr. L. Williams Lord, Baltimore, Maryland, and Dr. Richard W. Fowlkes, Richmond, Virginia.

Paper by Dr. Henry H. Hazen, Dr. Thomas Parran, Jr., and Dr. R. A. Vonderlehr, Washington, D. C.; Dr. Arthur H. Sanford, Rochester, Minnesota; Dr. Francis C. Senear, Chicago Illinois; and Dr. Walter M. Simpson, Dayton, Ohio, entitled "The Evaluation of Serodiagnostic Tests for Syphilis upon the Spinal Fluid" (Lantern Slides), was read by Dr. Hazen and was discussed by Dr. Harry M. Robinson, Baltimore, Maryland; Dr. R. A. Vonderlehr, Washington, D. C.; Dr. Charles R. Rein, New York, New York; Dr. Walter M. Simpson, Dayton, Ohio; and in closing by Dr. Hazen.

Paper by Dr. John H. Lamb and Dr. Everett S. Lain, Oklahoma City, Oklahoma, entitled "Nevo-Xantho-Endothelioma: Its Relationship to Juvenile Xanthoma" (Lantern Slides), was read by Dr. Lamb, and was discussed by Dr. J. Howard King, Nashville, Tennessee; Dr. Francis A. Ellis, Washington, D. C.; Dr. M. Toulmin Gaines, Mobile, Alabama; Dr. O. G. Hazel, Oklahoma City, Oklahoma; Dr. Fredk. D. Weidman, Philadelphia, Pennsylvania; and in closing by Dr. Lamb.

Dr. M. Toulmin Gaines, Mobile, Alabama, read a paper entitled "Suggestions and Inquiries on the Therapy of Skin Diseases," which was discussed by Dr. Emmett R. Hall, Memphis, Tennessee.

The Section then adjourned *sine die*.

SECTION ON SURGERY

Officers

Chairman—Dr. Isaac A. Bigger, Richmond, Virginia.
Vice-Chairman—Dr. James Barrett Brown, St. Louis, Missouri.
Secretary—Dr. Alton Ochsner, New Orleans, Louisiana.

Thursday, November 19, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 3, Baltimore, Maryland, and was called to order by the Chairman, Dr. Isaac A. Bigger, Richmond, Virginia, who presided.

Dr. David Henry Poer, Atlanta, Georgia, read a paper entitled "Newer Methods of Diagnosis and Treatment of Thyroid Disorders."

Dr. Daniel C. Elkin, Atlanta, Georgia, read a paper entitled "Thyroidectomy: Factors Influencing the Mortality."

Papers of Dr. Poer and Dr. Elkin were discussed by Dr. Wm. D. Haggard, Nashville, Tennessee; Dr. William F. Rienhoff Baltimore, Maryland; and in closing by Dr. Poer.

Dr. LeGrand Guerry, Columbia, South Carolina, read a paper entitled "A Discussion of the Management of Late Suppurative Peritonitis Cases," which was discussed by Dr. Walter D Wise, Baltimore, Maryland; Dr. Warfield M. Firor, Baltimore, Maryland; Dr. J. Shelton Horsley, Richmond, Virginia; and in closing by Dr. Guerry.

Dr. Hubert A. Royster, Raleigh, North Carolina, read a paper entitled "Notes on the Physiology and the Pathology of the Vermiform Appendix" (Lantern Slides), which was discussed by Dr. Harry H. Kerr, Washington, D. C.; Dr. J. M. T. Finney, Jr., Baltimore, Maryland; Dr. Jere L. Crook, Jackson, Tennessee; and in closing by Dr. Royster.

Dr. Jere L. Crook, Jackson, Tennessee, made a motion which was seconded by Dr. M. Casper, Louisville, Kentucky, and carried, that the Chairman appoint a Committee to study the subject of appendicitis and to formulate plans for propaganda for the lay public.

Dr. Edward D. Churchill, Boston, Massachusetts, read a paper entitled "The Surgical Treatment of Hyperparathyroidism" (Lantern Slides).

The Chairman appointed the following Nominating Committee: Dr. Robert L. Payne, Jr., Norfolk, Virginia; Dr. Walter D. Wise, Baltimore, Maryland; and Dr. Hugh A. Gamble, Greenville, Mississippi.

Dr. David R. Murphey, Jr., Tampa, Florida, read a paper entitled "Benign Lesions of the Breast Diagnosed and Treated as Carcinoma" (Lantern Slides), which was discussed by Dr. Dean Lewis, Baltimore, Maryland, and Dr. George A. Stewart, Baltimore, Maryland.

The Section then adjourned until 9:00 a. m. Friday.

Friday, November 20, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 3, Baltimore, Maryland, and was called to order by the Chairman, Dr. Isaac A. Bigger, Richmond, Virginia, who read his Chairman's Address entitled "Suppurative Pericarditis" (Lantern Slides).

A portrait of the late Dr. Joseph Colt Bloodgood, Baltimore, a past Chairman of this Section, presented to Saint Agnes' Hospital, Baltimore, by the Visiting Staff, was unveiled in the Section. Dr. J. M. T. Finney, Sr., gave the address,* and Dr. George A. Stewart, an associate of Dr. Bloodgood, unveiled the portrait. It was accepted for Saint Agnes' Hospital by Dr. J. King B. E. Seegar. The artist, Mr. Paul Roche, was presented.

Dr. Robert L. Payne, Norfolk, Virginia, read a paper entitled "Bile Tree Visualization: Its Surgical Importance."

Dr. R. L. Rhodes, Augusta, Georgia, read a paper entitled "Carcinoma of the Gallbladder."

Papers of Dr. Payne and Dr. Rhodes were discussed by Dr. Arthur M. Shipley, Baltimore, Maryland, and Dr. Frank S Lynn, Baltimore, Maryland.

Dr. J. Shelton Horsley, Richmond, Virginia, read a paper entitled "Emergency Surgery of the Stomach and Duodenum" (Lantern Slides), which was discussed by Dr. Harvey B. Stone, Baltimore, Maryland; Dr. L. Clarence Cohn, Baltimore, Maryland; and in closing by Dr. Horsley.

Dr. Randolph T. Smith, Little Rock, Arkansas, read a paper entitled "Gunshot Wounds in Peacetime Practice," which was discussed by Dr. J. M. T. Finney, Baltimore, Maryland, and Dr. Hugh A. Gamble, Greenville, Mississippi.

The Chairman appointed the following Committee on Publicity on Appendiceal Disease: Dr. J. M. T. Finney, Jr., Chairman, Baltimore, Maryland; Dr. Isidore Cohn, New Orleans, Louisiana; and Dr. Jere L. Crook, Jackson, Tennessee.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Alton Ochsner, New Orleans, Louisiana.
Vice-Chairman—Dr. William F. Rienhoff, Jr., Baltimore, Maryland.
Secretary—Dr. J. M. T. Finney, Jr., Baltimore, Maryland.

The Section then adjourned *sine die*.

---

*Address of Dr. J. M. T. Finney, Sr., Baltimore, at the unveiling of the portrait of the late Dr. Joseph Colt Bloodgood.

DR. JOSEPH COLT BLOODGOOD

Dr. Joseph Colt Bloodgood was born in Milwaukee, November 1, 1867. He was graduated from the University of Wisconsin with the degree of B.S. in 1888, and from the University of Pennsylvania with the degree of M.D. in 1891. A year later, he joined the staff of the Johns Hopkins Hospital as assistant resident surgeon. From that time on, his promotion was steady, until at his death he was Adjunct Professor of Surgery in the Johns Hopkins University and Hospital. He was Director of the Garvan Research Laboratory and of the Research Fund bearing his name. He was for many years Chief Surgeon of St. Agnes' Hospital. He was also a former Chairman of the Section on Surgery of the Southern Medical Association.

It was my great good fortune to have had the pleasure and privilege of Dr. Bloodgood's acquaintance from the very beginning of his career in Baltimore. During the early years of the Johns Hopkins Hospital, we were intimately associated on the Surgical Staff, under Professor William Stewart Halsted. During that period when the staff was much smaller than now, we came to know and respect each other, and a lasting friendship was formed. However, it did not take a long acquaintance to come to know and appreciate Dr. Bloodgood's many excellent qualities, both of head and heart. He was a man among men. His transparent honesty, his scientific curiosity, his boundless enthusiasm and tireless energy; his kindliness, and ever-present readiness to help others, were proverbial among the members of the staff. He was never known to speak an unkind word of anyone. What higher praise can be bestowed than this!

He greatly admired Dr. Halsted as scientist, investigator, and teacher; so much so, that he unconsciously imitated some of his personal characteristics and idiosyncrasies, much to the amusement and delight of the rest of us. But more especially was Dr. Bloodgood impressed by and he deliberately cultivated those habits of thought and methods of work that had made Dr. Hal-

sted the greatest contributor to the science and art of surgery, and the most inspiring surgical teacher of his time, in this country. Dr. Bloodgood was a worthy pupil of a great master. Brought up in the Halsted School of Surgery, and endowed with unusual physical and mental gifts as he was, there is little cause for wonder that in a comparatively short life he was able to accomplish so much that was worth while. Dr. Bloodgood was unconventional in his habits of thought and action, and hence at times misunderstood by those who did not know him—never by his friends.

He was a voluminous writer. A list of titles alone of his various contributions to surgical literature, compiled under the direction of his devoted wife, comprising papers, discussions editorials, and so on, makes a pamphlet of some fifty closely printed pages. While his writings cover nearly the entire range of surgery, and are of exceptional merit, he became in later years more especially interested perhaps in the causes, prevention and cure of cancer. He did yeoman service in educating the public in the approved methods of handling this scourge of mankind, and also as to the public's own responsibility in this matter. He was a leading authority in the field of surgical pathology, where his opinion and advice were in constant demand. Of his many contributions to surgery, perhaps the one of most far-reaching importance to surgical technic is the part that he played in the introduction of the rubber glove. Dr. Bloodgood has earned well-merited distinction at the hands of his patients, friends, fellow surgeons and his devoted students, who recognized in him a stimulating influence and a teacher of rare ability.

As a work of art, the artist has left little to be desired in this portrait of Dr. Bloodgood. But its artistic merit, important as that may be, is not the chief concern of the donors. It is rather their desire that through it future generations may know what manner of man he was, who by his faithful labors in the twin fields of general surgery and surgical pathology, had contributed so much to the advancement of knowledge and the sum total of human health and happiness. It is fitting that this portrait should find permanent lodgment in the institution where he labored long and faithfully, there to serve as an enduring memorial of that great surgeon, our friend and teacher, Dr Joseph Colt Bloodgood. In honoring him we honor ourselves.

SECTION ON BONE AND JOINT SURGERY

Officers

Chairman—Dr. Robert W. Johnson, Jr., Baltimore, Maryland.
Vice-Chairman—Dr. Guy A. Caldwell, Shreveport, Louisiana.
Secretary—Dr. Alfred R. Shands, Jr., Durham, North Carolina.

Wednesday, November 18, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 4, Baltimore, Maryland, and was called to order by the Chairman, Dr. Robert W. Johnson, Jr., Baltimore, Maryland, who presided.

Dr. Percy M. Girard, Dallas, Texas, read a paper entitled "Subcutaneous Hip Surgery in the Dislocated Hip" (Lantern Slides), which was discussed by Dr. Raymond E. Lenhard, Baltimore, Maryland, and Dr. J. Warren White, Greenville, South Carolina.

Dr. Robert C. Robertson, Chattanooga, Tennessee, read a paper entitled "Acute Hematogenous Osteomyelitis: Adjacent Joint Infections" (Lantern Slides), which was discussed by Dr. Robert R. Jones, Jr., Durham, North Carolina, and Dr. Randolph L. Anderson, Charleston, West Virginia.

Dr. Robert W. Johnson, Jr., Baltimore, Maryland, read his Chairman's Address entitled "The Frontiers of Orthopedic Surgery."

Dr. Wm. M. Roberts, Gastonia, North Carolina, read a paper entitled "A Review of Cases of Congenital Dislocation of the Hip Treated at the North Carolina Orthopedic Hospital" (Lantern Slides), which was discussed by Dr. Frederick A. Jostes, St. Louis, Missouri, and Dr. Athey R. Lutz, Huntington, West Virginia.

Dr. J. Albert Key, St. Louis, Missouri, read a paper entitled "Arthrodesis of the Knee with a Large Central Autogenous Bone Peg," which was discussed by Dr. J. Hiram Kite, Atlanta, Georgia, and Dr. Harold R. Bohlman, Baltimore, Maryland.

Dr. F. A. Hoshall, Charleston, South Carolina, read a paper entitled "Pyogenic Psoas Abscesses" (Lantern Slides), which was discussed by Dr. George A. Bennett, Baltimore, Maryland, and Dr. Custis Lee Hall, Washington, D. C.

The Chairman appointed the following Nominating Committee: Dr. J. Albert Key, St. Louis, Missouri; Dr. J. Warren White, Greenville, South Carolina; and Dr. William M. Roberts, Gastonia, North Carolina.

The Section then adjourned until 2:00 p. m. Thursday.

Thursday, November 19, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 4, Baltimore, Maryland, and was called to order by the Chairman, Dr. Johnson, who presided.

Dr. William T. Hammond, Easton, Maryland, read a paper entitled "Fracture Service in a Small General Hospital," which was discussed by Dr. H. Earle Conwell, Birmingham, Alabama, and Dr. Robert W. Johnson, Jr., Baltimore, Maryland.

Dr. H. Page Mauck, Richmond, Virginia, read a paper entitled "Treatment of Fractures of Both Bones of the Leg by Conservative Methods" (Moving Pictures), which was discussed by Dr. Allen F. Voshell, Baltimore, Maryland, and Dr. John T. Saunders, Asheville, North Carolina.

Paper by Dr. Ralph K. Ghormley and Dr. Harrison R. Wesson, Rochester, Minnesota, entitled "Surgical Treatment of Backache and Sciatica" (Lantern Slides), was read by Dr. Ghormley.

Dr. Guy W. Leadbetter, Washington, D. C., read a paper entitled "Fracture Dislocations of the Upper End of the Humerus" (Lantern Slides), which was discussed by Dr. Robert V. Funsten, University, Virginia.

Dr. H. Theodore Simon, New Orleans, Louisiana, read a paper entitled "Some Fundamentals in the Treatment of Fractures of the Lower Arm and Forearm" (Moving Pictures), which was discussed by Dr. J. Albert Key, St. Louis, Missouri, and Dr. I. William Nachlas, Baltimore, Maryland.

Dr. W. Kelly West, Oklahoma City, Oklahoma, read a paper entitled "The Choice of Bone Grafts in Fracture Surgery" (Lantern Slides), which was discussed by Dr. George E. Bennett, Baltimore, Maryland, and Dr. Ralph K. Ghormley, Rochester, Minnesota.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Guy A. Caldwell, Shreveport, Louisiana.
Vice-Chairman—Dr. Alfred R. Shands, Jr., Durham, North Carolina.
Secretary—Dr. J. Hiram Kite, Atlanta, Georgia.

The Section then adjourned *sine die*.

SECTION ON GYNECOLOGY

Officers

Chairman—Dr. Lee F. Turlington, Birmingham, Alabama.
Vice-Chairman—Dr. John C. Burch, Nashville, Tennessee.
Secretary—Dr. R. A. Ross, Durham, North Carolina.

Wednesday, November 18, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 3, Baltimore, Maryland, and was called to order by the Chairman, Dr. Lee F. Turlington, Birmingham, Alabama, who read his Chairman's Address entitled "The Responsibility of the Gynecologist to the So-Called Neurotic."

Paper by Dr. Bayard Carter and Dr. C. P. Jones, Durham, North Carolina, entitled "A Study of the Vaginal Flora in the Normal Female," was read by Dr. Carter, and was discussed by Dr. Richard W. TeLinde, Baltimore, Maryland; Dr. Philip C. Schreier, Memphis, Tennessee; and Dr. Karl J. Karnaky, Houston, Texas.

Dr. Joe Vincent Meigs, Boston, Massachusetts, read a paper entitled "Cancer of the Ovary," which was discussed by Dr. Curtis F. Burnam, Baltimore, Maryland, and in closing by the essayist.

The Chairman appointed the following Nominating Committee: Dr. Bayard Carter, Durham, North Carolina; Dr. William T. Pride, Memphis, Tennessee; and Dr. Chas. J. Andrews, Norfolk, Virginia.

Dr. Henry L. Darner, Washington, D. C., read a paper entitled "Preliminary Care of the Cervix in Subtotal Hysterectomy" (Lantern Slides), which was discussed by Dr. Edward H. Richardson, Baltimore, Maryland; Dr. Gilbert F. Douglas, Birmingham, Alabama; Dr. M. Casper, Louisville, Kentucky; Dr. Everard A. Wilcox, Augusta, Georgia; Dr. Edward Jelks, Jacksonville, Florida; and in closing by the essayist.

Dr. Olin S. Cofer, Atlanta, Georgia, read a paper entitled "The Treatment of Procidentia Uteri by the Vaginal Route" (Lantern Slides), which was discussed by Dr. Guy L. Hunner, Baltimore, Maryland; Dr. John W. Turner, Atlanta, Georgia; and in closing by the essayist.

Dr. John F. Lucas, Greenville, Mississippi, read a paper entitled "Elliott Treatment in Pelvic Infections," which was discussed by Dr. Thomas S. Cullen, Baltimore, Maryland; Dr. Chas. J. Andrews, Norfolk, Virginia; and in closing by the essayist.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. John C. Burch, Nashville, Tennessee.
Vice-Chairman—Dr. R. A. Ross, Durham, North Carolina.
Secretary—Dr. John F. Lucas, Greenville, Mississippi.

The Section then adjourned until 2:00 p. m. Thursday for a joint session with the Section on Obstetrics (see minutes of Section on Obstetrics).

SECTION ON OBSTETRICS

Officers

Chairman—Dr. James R. Bloss, Huntington, West Virginia.
Vice-Chairman—Dr. Warren E. Massey, Dallas, Texas.
Secretary—Dr. Milton Smith Lewis, Nashville, Tennessee.

Wednesday, November 18, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 3, Baltimore, Maryland, and was called to order by the Chairman, Dr. James R. Bloss, Huntington, West Virginia, who presided.

The Chairman appointed the following Nominating Committee: Dr. M. Pierce Rucker, Richmond, Virginia; Dr. W. B. Anderson, Nashville, Tennessee; and Dr. Richard Paddock, St. Louis, Missouri.

Dr. James R. Bloss, Huntington, West Virginia, read his Chairman's Address entitled "The Importance of Routine Thyroid Study in Prenatal Care."

Dr. Paul Titus, Secretary, The American Board of Obstetrics and Gynecology, Pittsburgh, Pennsylvania, read a paper entitled "Human Sterility" (Lantern Slides).

Dr. H. Hudnall Ware, Jr., Richmond, Virginia, read a paper entitled "A Review of Eclampsia at the Medical College of Virginia Hospitals" (Lantern Slides), which was discussed by Dr. M. Pierce Rucker, Richmond, Virginia; Dr. Chas. H. Peckham, Baltimore, Maryland; and Dr. S. A. Cosgrove, Jersey City, New Jersey.

Paper by Dr. Amey Chappell and Dr. F. Lee Bivings, Atlanta, Georgia, entitled "Anemia and Pregnancy: A Three-Year Study on Negro Women" (Lantern Slides), was read by Dr. Chappell, and was discussed by Dr. E. Durham Colvin, Atlanta, Georgia, and Dr. Richard Paddock, St. Louis, Missouri.

Paper by Dr. Edward L. King, Dr. Ernest Carroll Faust and Dr. John T. Sanders, New Orleans, Louisiana, entitled "Intestinal Parasitic Infections Complicating Pregnancy," was read by Dr. Sanders, and was discussed by Dr. Nicholas J. Eastman, Baltimore, Maryland, and Dr. Alan F. Guttmacher, Baltimore, Maryland.

Dr. T. K. Brown, St. Louis, Missouri, read a paper entitled "Treatment of Abortion," which was discussed by Dr. James M. H. Rowland, Baltimore, Maryland, and Dr. Louis H. Douglass, Baltimore, Maryland.

The Chairman raised the question should the Section have an Executive Committee to work with the officers on such matters as they might wish assistance. It was moved and carried that the Section have an Executive Committee to be appointed by the incoming Chairman.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Warren E. Massey, Dallas, Texas.
Vice-Chairman—Dr. John McF. Bergland, Baltimore, Maryland.
Secretary—Dr. Milton Smith Lewis, Nashville, Tennessee.

The Section then adjourned until 2:00 p. m. Thursday for a joint session with the Section on Gynecology.

Thursday, November 19, 2:00 p. m.

Joint Session, Section on Obstetrics and Section on Gynecology.

The Sections, in joint session, met in the Fifth Regiment Armory, Assembly Room No. 3, Baltimore, Maryland, and were called to order by Dr. James R. Bloss, Huntington, West Virginia, Chairman of the Section on Obstetrics, who presided at the Section Clinic, Obstetrical Cases. Dr. Lee F. Turlington, Chairman of the Section on Gynecology, presided at Section Clinic, Gynecological Cases.

Section Clinic, Obstetrical Cases, conducted by Dr. Paul Titus, Secretary, The American Board of Obstetrics and Gynecology, Pittsburgh, Pennsylvania.

(a) "Placenta Praevia, with Death on the Forty-Ninth Day Postpartum, from Thrombophlebitis." Case furnished and reported by Dr. Chas. H. Peckham, Baltimore, Maryland.

(b) "Nephritis Toxemia of Pregnancy: Premature Separation of Placenta: Cesarean Section, with Hysterectomy. Recovery." Case furnished and reported by Dr. Alan F. Guttmacher, Baltimore, Maryland.

(c) "Spontaneous Delivery in Multipara: Moderate External Hemorrhage: Profound Shock. Death. Autopsy: Rupture of Uterus." Case furnished and reported by Dr. Adelbert L. Dippel, Baltimore, Maryland.

Section Clinic, Gynecological Cases, conducted by Dr. Joe Vincent Meigs, Boston, Massachusetts, and Dr. Emil Novak Baltimore, Maryland, both discussing the cases presented. Dr. John C. Burch, Nashville, Tennessee, also discussed case (b) (1).

(a) "Two Cases of Very Early Cancer of the Cervix" (Lantern Slides). Cases furnished and reported by Dr. Charles B. Brack, Jr., Baltimore, Maryland.

(b) (1) "Hyperplasia of the Endometrium at Puberty," and (2) "Chorio-Epithelioma" (Lantern Slides). Cases furnished and reported by Dr. John C. Dumler, Baltimore, Maryland.

(c) "Four Recent Interesting Ovarian Tumors (Granulosa-Cell Carcinoma, Arrhenoblastoma, Disgerminoma, Brenner Tumor)" (Lantern Slides). Cases furnished and reported by Dr. Laman A. Gray, Baltimore, Maryland.

The Joint Session then adjourned *sine die*.

SECTION ON UROLOGY

Officers

Chairman—Dr. Thomas D. Moore, Memphis, Tennessee.
Vice-Chairman—Dr. Grayson Carroll, St. Louis, Missouri.
Secretary—Dr. Jefferson C. Pennington, Nashville, Tennessee.

Wednesday, November 18, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 2, Baltimore, Maryland, and was called to order by the Chairman, Dr. Thomas D. Moore, Memphis, Tennessee, who presided.

Paper by Dr. Earl H. Floyd and Dr. James L. Pittman, Atlanta, Georgia, entitled "Malignant Tumors of the Adult Kidney," was read by Dr. Floyd, and was discussed by Dr. Isaac G. Duncan, Memphis, Tennessee, and Dr. Robt. M. Willoughby, New Orleans, Louisiana.

Paper by Dr. W. Calhoun Stirling and A. M. Lands (Ph.D.), Washington, D. C., entitled "Blood Findings and Renal Function Test in Kidney Trauma: An Experimental Study," was read by Dr. Stirling, and was discussed by Dr. Marcus G. Spingarn, Memphis, Tennessee, and Dr. R. M. LeComte, Washington, D. C.

Dr. Hamilton W. McKay, Charlotte, North Carolina, read a paper entitled "Incontinence of Urine Due to Ectopic Vaginal Ureter" (Lantern Slides), which was discussed by Dr. Guy L. Hunner, Baltimore, Maryland, and Dr. Lawrence R. Wharton, Baltimore, Maryland.

Dr. Frank L. Van Alstine, Jackson, Mississippi, read a paper entitled "The Present Status in the Treatment of Chronic Prostatitis," which was discussed by Dr. J. Ullman Reaves, Mobile, Alabama, and Dr. Chester D. Allen, Memphis, Tennessee.

Dr. Maximillian Ehrenstein, University, Virginia, read a paper entitled "General Report on Recent Advances in the Field of the Male Sex Hormones" (Lantern Slides), which was discussed by Dr. Carl G. Hartman, Baltimore, Maryland.

Dr. Neil S. Moore, St. Louis, Missouri, read a paper entitled "Diverticulum of the Urinary Bladder," which was discussed by Dr. James L. Estes, Tampa, Florida.

The Section then adjourned until 2:00 p. m. Thursday.

Thursday, November 19, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 2, Baltimore, Maryland, and was called to order by the Chairman, Dr. Thomas D. Moore, Memphis, Tennessee, who read his Chairman's Address entitled "The Development of Renal Surgery: A Brief Historical Sketch" (Lantern Slides).

Dr. Wm. F. Braasch, Rochester, Minnesota, read a paper entitled "Unusual Cases of Pyelonephritis" (Lantern Slides), which was discussed by Dr. Albert E. Goldstein, Baltimore, Maryland.

The Chairman appointed the following Nominating Committee: Dr. Edgar G. Ballenger, Atlanta, Georgia; Dr. Grayson L. Carroll, St. Louis, Missouri; and Dr. Robert B. McIver, Jacksonville, Florida.

Dr. Wm. P. Herbst, Jr., Washington, D. C., read a paper entitled "Patent Urachus" (Lantern Slides), which was discussed by Dr. Edgar G. Ballenger, Atlanta, Georgia, and Dr. H. King Wade, Hot Springs National Park, Arkansas.

Paper by Dr. Rex E. Van Duzen and Dr. Wm. W. Looney, Dallas, Texas, entitled "Correlation of Clinical and Anatomical Studies of the Vesical Neck," was read by Dr. Van Duzen, and was discussed by Dr. Hugh H. Young, Baltimore, Maryland, and Dr. S. Raymond Thompson, Charlotte, North Carolina.

Dr. Louis M. Orr, Jr., Orlando, Florida, read a paper entitled "Management of the Atonic Bladder Due to Obstruction of Vesical Neck," which was discussed by Dr. H. Fay H. Jones, Little Rock, Arkansas.

Paper by Dr. E. Clay Shaw and Dr. Jack A. McKenzie, Miami, Florida, entitled "The Curve of Phenolsulphonphthalein Elimination in Unilateral Kidney Disease" (Lantern Slides), was read by Dr. Shaw, and was discussed by Dr. Andrew J. Crowell, Charlotte, North Carolina; Dr. Edwin P. Alyea, Durham, North Carolina; and Dr. Hugh H. Young, Baltimore, Maryland.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Hamilton W. McKay, Charlotte, North Carolina.
Vice-Chairman—Dr. Albert E. Goldstein, Baltimore, Maryland.
Secretary—Dr. Jefferson C. Pennington, Nashville, Tennessee.

The Section then adjourned *sine die*.

SECTION ON RAILWAY SURGERY

Officers

Chairman—Dr. Ross A. Woolsey, St. Louis, Missouri.
Vice-Chairman—Dr. J. W. Palmer, Ailey, Georgia.
Secretary—Dr. George A. Traylor, Augusta, Georgia.

Wednesday, November 18, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 4, Baltimore, Maryland, and was called to order by the Chairman, Dr. Ross A. Woolsey, St. Louis, Missouri, who read his Chairman's Address entitled "Intestinal Obstruction Due to Posture" (Lantern Slides).

Dr. Robert Carothers, Cincinnati, Ohio, read a paper entitled "The Doctor in Court," which was discussed by Dr. James R. Garner, Atlanta, Georgia; Dr. Robert L. Payne, Norfolk, Virginia; and in closing by the essayist.

Dr. Bradley L. Coley, New York, New York, read a paper entitled "Treatment of Hernia, with Particular Reference to the Injection Method" (Lantern Slides), which was discussed by Dr. Dean Lewis, Baltimore, Maryland; Dr. Joshua F. Abel, Waynesville, North Carolina; Dr. Alton Ochsner, New Orleans, Louisiana; Dr. Robert L. Payne, Norfolk, Virginia; and in closing by the essayist.

Dr. Stewart R. Roberts, Atlanta, Georgia, read a paper entitled "Cardiovascular-Renal Disease," which was discussed by Dr. Wm. R. Houston, Austin, Texas; Dr. Virgil P. Sydenstricker, Augusta, Georgia; Dr. Ross A. Woolsey, St. Louis, Missouri; and in closing by the essayist.

The Chairman appointed the following Nominating Committee: Dr. James R. Garner, Atlanta, Georgia; Dr. Joseph D. Collins, Norfolk, Virginia; and Dr. Edward T. Newell, Chattanooga, Tennessee.

Dr. W. J. Lancaster, Wilmington, North Carolina, read a paper entitled "Fractures of the Os Calcis," which was discussed by Dr. Henry M. Michel, Augusta, Georgia; Dr. Roy W. Locher, Baltimore, Maryland; and in closing by the essayist.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. J. W. Palmer, Ailey, Georgia.
Vice-Chairman—Dr. Edward V. Milholland, Baltimore, Maryland.
Secretary—Dr. George A. Traylor, Augusta, Georgia.

Dr. Edward Thomas Newell, Chattanooga, Tennessee, read a paper entitled "The Non-Operative Treatment of Fractures and Dislocations of the Spine: Case Reports" (Lantern Slides), which was discussed by Dr. Francis J. Kirby, Baltimore, Maryland.

The Section then adjourned *sine die*.

SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY

Officers

Chairman—Dr. Millard F. Arbuckle, St. Louis, Missouri.
Vice-Chairman—Dr. Grady E. Clay, Atlanta, Georgia.
Secretary—Dr. Oscar M. Marchman, Dallas, Texas.

Wednesday, November 18, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 5, Baltimore, Maryland, and in the absence of the Chairman, Dr. Arbuckle, who was ill, was called to order by the Vice-Chairman, Dr. Grady E. Clay, Atlanta, Georgia, who presided.

Dr. Carlos E. Finlay, Havana, Cuba, an ophthalmologist, was introduced and addressed the Section.

SYMPOSIUM ON INFECTIONS OF THE MIDDLE EAR, WITH THE COMPLICATIONS AND SEQUELAE, INCLUDING THE PATHWAYS OF DISSEMINATION

Dr. Dorothy Wolf, St. Louis, Missouri, read a paper entitled "Microscopic Anatomy of the Temporal Bone, Showing Pathologic Routes of Extension to the Cranial Cavity" (Lantern Slides and Microscopic Slides), which was discussed by Dr. Samuel J. Crowe, Baltimore, Maryland, and Dr. Ella M. A. Enlows, Washington, D. C.

Dr. John J. Shea, Memphis, Tennessee, read a paper entitled "Acute Infections of the Middle Ear and the Mastoid Cells" (Lantern Slides), which was discussed by Dr. Edward A. Looper, Baltimore, Maryland.

Dr. M. M. Cullom, Nashville, Tennessee, read a paper entitled "Chronic Middle Ear and Mastoid Infection" (Lantern Slides), which was discussed by Dr. Edmund W. Rucker, Jr., Birmingham, Alabama, and Dr. John R. Hume, New Orleans, Louisiana.

Paper by Dr. Leonard T. Furlow and Dr. Fred C. Reynolds, St. Louis, Missouri, entitled "Pyogenic Meningitis" (Lantern Slides), was read by Dr. Furlow, and was discussed by Dr. James G. Lyerly, Jacksonville, Florida, and Dr. Edgar F. Fincher, Jr., Atlanta, Georgia.

Dr. E. H. Cary, Dallas, Texas, read a paper entitled "The Morbidity of the Optic Nerve," which was discussed by Dr. Clifton M. Miller, Richmond, Virginia.

The Section then adjourned until 9:00 a. m. Thursday.

Thursday, November 19, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 5, Baltimore, Maryland, and was called to order by the Chairman, Dr. Millard F. Arbuckle, St. Louis, Missouri, who read his Chairman's Address entitled "The Function of the Otolaryngologist" (Lantern Slides).

Dr. Arthur J. Bedell, Albany, New York, read a paper entitled "The Ophthalmoscopical Differentiation between Papilledema and Papillitis" (Lantern Slides).

Paper by Dr. Murdock Equen and Dr. Frank Neuffer, Atlanta, Georgia, entitled "Total Laryngectomy as an Approach to Esophageal Carcinoma: Recovery," was read by Dr. Equen, and was discussed by Dr. Waitman F. Zinn, Baltimore, Maryland; Dr. W. Likely Simpson, Memphis, Tennessee; and Dr. Chevalier L. Jackson, Philadelphia, Pennsylvania.

Dr. Kingley W. Cosgrove, Little Rock, Arkansas, read a paper entitled "Sarcoma of the Choroid."

The Chairman appointed the following Nominating Committee: Dr. Wm. Thornwall Davis, Washington, D. C.; Dr. William A. Wagner, New Orleans, Louisiana; and Dr. Thomas W. Moore, Huntington, West Virginia.

The Section then adjourned until 9:00 a. m. Friday.

Friday, November 20, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 5, Baltimore, Maryland, and was called to order by the Chairman, Dr. Arbuckle, who presided.

Dr. A. G. Wilde, Jackson, Mississippi, read a paper entitled "The Diagnostic Value of Episcleritis," which was discussed by Dr. Clyde A. Clapp, Baltimore, Maryland.

Dr. H. Rommel Hildreth, St. Louis, Missouri, read a paper entitled "Ox-Fascia-Transplant Operation for Ptosis" (Lantern Slides), which was discussed by Dr. Amos R. Koontz, Baltimore, Maryland, and Dr. Jas. W. McKinney, Memphis, Tennessee.

Dr. Elbyrne G. Gill, Roanoke, Virginia, read a paper entitled "The Management of Blood Stream Infection with Special Reference to Immunized Blood Transfusions: Case Reports" (Lantern Slides), which was discussed by Dr. John A. Kolmer, Philadelphia, Pennsylvania, and Dr. Fletcher D. Woodward, Charlottesville, Virginia.

Dr. Wm. Thornwall Davis, Washington, D. C., read a paper entitled "The Orthoptic Treatment of Squint" (Motion Pictures), which was discussed by Dr. Jno. O. McReynolds, Dallas, Texas.

Dr. Grady E. Clay, Atlanta, Georgia, read a paper entitled "Interesting Lesions of the Fundus Oculi" (Photographs).

Dr. Thomas W. Moore, Huntington, West Virginia, made a motion, which was seconded and carried, that the thanks of the Section be extended to the Baltimore physicians for their many courtesies extended the visiting physicians during their stay in their city.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. Grady E. Clay, Atlanta, Georgia.
Vice-Chairman—Dr. Oscar M. Marchman, Dallas, Texas.
Secretary—Dr. John R. Hume, New Orleans, Louisiana.

The Section then adjourned *sine die*.

SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY

ROUND TABLE SESSION

Thursday, November 19, 2:00 p. m.

The Round Table Session was held in the Fifth Regiment Armory, Assembly Room No. 5, Baltimore, Maryland.

OPHTHALMOLOGY

Dr. A. G. Wilde, Jackson, Mississippi, Chairman for Ophthalmology, presiding.

Dr. Jonas S. Friedenwald, Baltimore, Maryland, presented the subject "Pathology and Fundi" (Lantern Slides).

Dr. Halstead S. Hedges, University, Virginia, presented the subject "External Conditions of the Eye."

Dr. Phil M. Lewis, Memphis, Tennessee, presented the subject "Surgery."

OTOLARYNGOLOGY

Dr. Claude C. Cody, Houston, Texas, Chairman for Otolaryngology, presiding.

Dr. John G. McLaurin, Dallas, Texas, presented the subject "Indications for Radical Sinus Surgery."

Dr. Nathan Womack, St. Louis, Missouri, presented the subject "Clinical Studies in Cancer of Larynx, Trachea and Bronchi."

Dr. W. Likely Simpson, Memphis, Tennessee, presented the subject "Technic of External Ethmofrontal Operation."

The Round Table Session then adjourned *sine die*.

SECTION ON MEDICAL EDUCATION

Officers

Chairman—Dr. Harry C. Schmeisser, Memphis, Tennessee.
Vice-Chairman—Dr. Russell H. Oppenheimer, Atlanta, Georgia.
Secretary—Dr. Harvey S. Thatcher, Little Rock, Arkansas.

Wednesday, November 18, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 6, Baltimore, Maryland, and was called to order by the Chairman, Dr. Harry C. Schmeisser, Professor of Pathology and Director of Pathological Institute, University of Tennessee College of Medicine, Memphis, Tennessee, who read his Chairman's Address entitled "The Comprehensive Examinations at the University of Tennessee."

Dr. George H. Meeker, Dean, University of Pennsylvania, Graduate School of Medicine, Philadelphia, Pennsylvania, read a paper entitled "Concerning Norms, Nebulae and Foreign Bodies in Requirements for Clinical Certifications."

The Chairman appointed the following Nominating Committee: Dr. L. W. Diggs, Memphis, Tennessee; Dr. Eugene R. Whitmore, Washington, D. C.; and Dr. Alphonse M. Schwitalla, St. Louis, Missouri.

Dr. Robert Wilson, Dean, Medical College of the State of South Carolina, Charleston, South Carolina, read a paper entitled "The Basis of Selection of Medical Students," which was discussed by Dr. J. M. H. Rowland, Baltimore, Maryland; Dr. W. S. Leathers, Nashville, Tennessee; and in closing by the essayist.

Rev. Alphonse M. Schwitalla, S.J., Ph.D., Dean, St. Louis University School of Medicine, St. Louis, Missouri, read a paper entitled "Medical Education and Medical Practice," which was discussed by Dr. Dean Lewis, Baltimore, Maryland; Dr. Maurice C. Pincoffs, Baltimore, Maryland; and Dr. W. D. Haggard, Nashville, Tennessee.

Dr. Wyndham B. Blanton, Professor of the History of Medicine, Medical College of Virginia, Richmond, Virginia, read a paper entitled "Medical Education in New Spain," which was discussed by Dr. Henry E. Sigerest, Baltimore, Maryland; Dr. Lewis J. Moorman, Oklahoma City, Oklahoma; and Dr. Hugh H. Trout, Roanoke, Virginia.

Dr. O. W. Hyman, Dean, University of Tennessee College of Medicine, Memphis, Tennessee, read a paper entitled "The Number and Distribution of Physicians in the Southern States as Bearing upon the Policies of Southern Medical Colleges," which was discussed by Dr. W. T. Sanger, Richmond, Virginia, and Dr. C. C. Bass, New Orleans, Louisiana.

Paper by Dr. E. V. Cowdry, Professor of Cytology, Washington University School of Medicine, St. Louis, Missouri, entitled "The Place of Histology in Medical Education," was read by title on account of the lateness of the hour. Dr. Cowdry was present and was prepared to read his paper.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. C. C. Bass, New Orleans, Louisiana.
Vice-Chairman—Dr. Stuart Graves, University, Alabama.
Secretary—Dr. Harvey S. Thatcher, Little Rock, Arkansas.

The Section then adjourned *sine die*.

ALLERGY CLINIC AND ROUND TABLE

Meeting conjointly with Southern Medical Association

Officers

Chairman—Dr. Hal M. Davison, Atlanta, Georgia.
Vice-Chairman—Dr. Alan G. Cazort, Little Rock, Arkansas.
Secretary—Dr. Charles H. Eyermann, St. Louis, Missouri.

Thursday, November 19, 9:00 a. m.

The Allergy Clinic and Round Table met in the Fifth Regiment Armory, Assembly Room No. 2, Baltimore, Maryland, and was called to order by the Chairman, Dr. Hal M. Davison, Atlanta, Georgia, who presided.

Dr. David M. Pipes, Shreveport, Louisiana, read a paper entitled "The Incidence of Major and Minor Allergy in the Deep South" (Lantern Slides), which was discussed by Dr. Marion T. Davidson, Birmingham, Alabama; Dr. Oscar Swineford, Jr., Charlottesville, Virginia; and in closing by the essayist.

Dr. Walter L. Winkenwerder, Baltimore, Maryland, read a paper entitled "The Clinical Course and Treatment of Allergic Rhinitis" (Lantern Slides), which was discussed by Dr. John P. Henry, Memphis, Tennessee; Dr. Charles H. Eyermann, St. Louis, Missouri; and in closing by the essayist.

Paper by Dr. Homer E. Prince, Houston, Texas, and Marie Betzner Morrow (Ph.D.), Austin, Texas, entitled "Molds in the Etiology of Asthma and Hay Fever with a Special Reference to the Coastal Areas of Texas" (Lantern Slides), was read by Dr. Prince, and was discussed by Dr. Grafton T. Brown, Washington, D. C.; Dr. Charles Thom, Washington, D. C.; and in closing by Dr. Prince.

Dr. Frank F. Furstenberg, Baltimore, Maryland, read a paper entitled "The Occurrence of Constitutional Reactions, Their Analysis as to Cause," which was discussed by Dr. J. Harvey Black, Dallas, Texas; Dr. Marion T. Davidson, Birmingham, Alabama; and in closing by the essayist.

Dr. Oscar Swineford, Jr., Charlottesville, Virginia, read a paper entitled "Asthma in Heart Disease: A Clinical Study with Especial Reference to Cardiac Asthma" (Lantern Slides), which was discussed by Dr. Henry B. Mulholland, Charlottesville, Virginia; Dr. Benjamin M. Baker, Jr., Baltimore, Maryland; and in closing by the essayist.

Dr. Arthur F. Coca, New York, New York, read a paper entitled "The Classification of the Phenomenon of Immunologic Hypersensitiveness."

Dr. Orval R. Withers, Kansas City, Missouri, read a paper entitled "Food Allergens: A Statistical Analysis of Fifty Cases Relative to the Genetic Classification of Foods" (Lantern Slides), which was discussed by Dr. Leslie N. Gay, Baltimore, Maryland; Dr. Hal M. Davison, Atlanta, Georgia; and in closing by the essayist.

Following the Scientific program, a business session was held.

The Nominating Committee reported the following nominations for officers, the nominees being duly elected:

Chairman—Dr. J. Harvey Black, Dallas, Texas.
Vice-Chairman—Dr. Oscar Swineford, Jr., Charlottesville, Virginia.
Secretary—Dr. Charles H. Eyermann, St. Louis, Missouri.

The Allergy Clinic and Round Table then adjourned *sine die*.

SECTION ON PUBLIC HEALTH

Officers

Chairman—Dr. Douglas L. Cannon, Montgomery, Alabama.
Vice-Chairman—Dr. William H. F. Warthen, Baltimore, Md.
Secretary—Dr. W. C. Williams, Nashville, Tennessee.

Wednesday, November 18, 2:00 p. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 8, Baltimore, Maryland, and was called to order by the Chairman, Dr. Douglas L. Cannon, Montgomery, Alabama, who presided.

The Chairman appointed the following Nominating Committee: Dr. Robert H. Riley, Baltimore, Maryland; Dr. John A. Milne, Jackson, Mississippi; and Dr. W. Myers Smith, Baltimore, Maryland.

SYMPOSIUM ON SYPHILIS

Dr. Thomas Parran, Jr., Surgeon General, U. S. Public Health Service, Washington, D. C., delivered an address entitled "Syphilis as a Public Health Problem."

Dr. W. A. Brumfield, Jr., Medical Consultant, New York State Department of Health, Albany, New York, read a paper entitled "The Epidemiologic Aspects of Syphilis Control," which was discussed by Dr. F. O. Reinhard, Baltimore, Maryland.

Dr. J. E. Moore, Professor of Dermatology and Syphilology, Johns Hopkins University School of Medicine, Baltimore, Maryland, read a paper entitled "Prophylaxis and Treatment in Syphilis Control."

Dr. R. A. Vonderlehr, Assistant Surgeon General, Division of Venereal Diseases, U. S. Public Health Service, Washington D. C., read a paper entitled "The Mass Control of Syphilis" (Lantern Slides), which was discussed by Dr. Dudley C. Smith, University, Virginia.

Paper by Dr. F. L. Roberts, Director, Gibson County Health Department, Trenton, Tennessee, and Dr. W. C. Williams, Commissioner of Public Health of Tennessee, Nashville, Tennessee, entitled "The Results of a County-Wide Survey and an Outline of the Syphilis Control Program in Gibson County, Tennessee," was read by Dr. Roberts, and was discussed by Dr. Lowell J. Reed, Baltimore, Maryland, and Dr. I. C. Riggin, Richmond, Virginia.

The Symposium in general was discussed by Dr. Eugene C. Peck, Oakland, Maryland; Dr. Bradford Massey, Pocomoke, Maryland; and in closing by Dr. W. A. Brumfield, Jr., Albany, New York, and Dr. R. A. Vonderlehr, Washington, D. C.

Dr. R. E. Dyer, U. S. Public Health Service, Washington, D. C., read a paper entitled "Typhus Fever: A Problem for Southern Health Officers," which was discussed by Dr. Chas. H. Halliday, Baltimore, Maryland, and Dr. W. H. Pickett, Pensacola, Florida.

Dr. J. A. Milne, Supervisor of Field Unit, Mississippi State Board of Health, Jackson, Mississippi, read a paper entitled "Local Responsibilities in Communicable Disease Control," which was discussed by Dr. J. A. Crabtree, Knoxville, Tennessee, and Dr. Myron G. Tull, Baltimore, Maryland.

The Section then adjourned until 9:00 a. m. Thursday.

Thursday, November 19, 9:00 a. m.

The Section met in the Fifth Regiment Armory, Assembly Room No. 8, Baltimore, Maryland, and was called to order by the Vice-Chairman, Dr. William H. F. Warthen, Baltimore, Maryland, who presided while the Chairman read his address.

Dr. Douglas L. Cannon, Montgomery, Alabama, read his Chairman's Address entitled "Jerome Cochran, the South's First Gift to Public Health."

Dr. Mazyck P. Ravenel, Columbia, Missouri, and Dr. Arthur T. McCormack, Louisville, Kentucky, discussed public health history and its makers.

SYMPOSIUM ON MATERNAL AND CHILD HYGIENE

Dr. Albert McCown, Director, Maternal and Child Health Division, U. S. Children's Bureau, Washington, D. C., read a paper entitled "The General Plan and Objectives of a Maternal and Infant Hygiene Program."

Dr. E. D. Colvin, Atlanta, Georgia, read a paper entitled "Maternal Mortality in Georgia During 1935."

Dr. Ethel Dunham, U. S. Children's Bureau, Washington, D. C., read a paper entitled "Causes of Stillbirth: A Preliminary Report Based on Two Thousand Cases Occurring in Hospitals" (Lantern Slides), which was discussed by Dr. Felix J. Underwood, Jackson, Mississippi.

Dr. J. B. Black, Director, Rutherford County Health Department, Murfreesboro, Tennessee, read a paper entitled "The Infant Hygiene Program and Results in Rutherford County, Tennessee" (Lantern Slides), which was discussed by Dr. Harry S. Mustard, Baltimore, Maryland, and Dr. M. Alexander Novey, Baltimore, Maryland.

Dr. Horton Casparis, Professor of Pediatrics, Vanderbilt University School of Medicine, Nashville, Tennessee, read a paper entitled "Preventive Pediatrics," which was discussed by Dr. J. H. Mason Knox, Jr., Baltimore, Maryland.

The Symposium was discussed in closing by Dr. Albert McCown, Washington, D. C., and Dr. Horton Casparis, Nashville, Tennessee.

Paper by Dr. W. B. Grayson and Dr. W. Myers Smith, Arkansas State Board of Health, Little Rock, Arkansas, entitled "Childhood Type Tuberculosis," was read by Dr. Grayson, and was discussed by Dr. Horton Casparis, Nashville, Tennessee.

Dr. A. V. Hardy, Consultant, U. S. Public Health Service, Albuquerque, New Mexico, read a paper entitled "Bacillary Dysentery, with Special Reference to the Southwest," which was discussed by Dr. W. H. Frost, Baltimore, Maryland.

The Nominating Committee reported the following nominations for Section officers, the nominees being duly elected by vote of the Section:

Chairman—Dr. T. H. D. Griffitts, Savannah, Georgia.
Vice-Chairman—Dr. W. B. Grayson, Little Rock, Arkansas.
Secretary—Dr. W. C. Williams, Nashville, Tennessee.

The Section then adjourned *sine die*.

SOUTHERN BRANCH, AMERICAN PUBLIC HEALTH ASSOCIATION

Meeting conjointly with Southern Medical Association.

Officers

President—Dr. I. C. Riggin, Richmond, Virginia.
First Vice-President—Dr. C. J. Vaughn, Lexington, Mississippi.
Second Vice-President—Miss Frances C. Montgomery, Montgomery, Alabama.
Third Vice-President—Mr. M. Z. Bair, Little Rock, Arkansas.
Secretary-Treasurer—Dr. G. Foard McGinnes, Richmond, Virginia.

Tuesday, November 17, 9:30 a. m.

The Section of Public Health Nursing, Miss Frances Montgomery, presiding, and the Section of Sanitary Engineers and Sanitation Officers, Mr. Abel Wolman, presiding, held meetings in the Fifth Regiment Armory, Assembly Rooms 8 and 9, Baltimore, Maryland.

Tuesday, November 17, 12:30 p. m.

Meeting of the Governing Council, Lord Baltimore Hotel, Dr. I. C. Riggin, President, presiding.

Tuesday, November 17, 2:00 p. m.

The fifth annual General Scientific Session convened in the Fifth Regiment Armory, Assembly Room No. 8, and was called to order by the President, Dr. I. C. Riggin, State Health Commissioner, Richmond, Virginia, who presided.

Paper by Dr. George E. Riley and Mr. Nelson H. Rector, Malaria Control Division, Mississippi State Board of Health, Jackson, Mississippi, entitled "Screening as a Part of Malaria Control," was read by Dr. Riley, and was discussed by Mr. J. A. LePrince, Memphis, Tennessee.

SYMPOSIUM ON POLIOMYELITIS

Dr. I. C. Riggin, State Health Commissioner, Richmond, Virginia, read his President's Address, entitled "A Study of Poliomyelitis in Virginia in 1935."

Dr. J. N. Baker, State Health Officer, Montgomery, Alabama, read a paper entitled "Poliomyelitis in Alabama in 1936."

Dr. Charles Armstrong, Surgeon, U.S.P.H.S., Washington, D. C., read a paper entitled "Results of a Field Study on the Prophylactic Use of the Nasal Spray in Alabama" (Lantern Slides).

Papers in the Symposium were discussed by Dr. Felix J. Underwood, Jackson, Mississippi; Dr. W. C. Williams, Nashville, Tennessee; and in closing by Dr. Baker and Dr. Armstrong.

The Association then adjourned until 9:30 a. m. Wednesday.

Wednesday, November 18, 9:30 a. m.

The General Scientific Session met in the Fifth Regiment Armory, Assembly Room No. 8, Baltimore, Maryland, and was called to order by the President, Dr. Riggin, who presided.

Paper by Dr. Adolph Weinzirl, Epidemiologist, Baltimore City Health Department, and Dr. C. H. Halliday, Epidemiologist, Maryland State Department of Health, Baltimore, Maryland entitled "Insect-Borne Tularemia in Maryland," was read by Dr. Weinzirl, and was discussed by Dr. W. B. Grayson, Little Rock, Arkansas.

Paper by Dr. E. L. Stebbins, District State Health Officer, and Miss Elizabeth Reed, Rochester, New York, entitled "Typhoid Carriers and Carrier-Borne Typhoid Fever in New York State" (Lantern Slides), was read by Dr. Stebbins, and was discussed by Dr. Huntington Williams, Baltimore, Maryland, and Dr. D. G. Gill, Montgomery, Alabama.

Dr. W. H. Frost, Professor of Epidemiology, Johns Hopkins University School of Hygiene and Public Health, Baltimore Maryland, read a paper entitled "The Age Selection of Mortality from Tuberculosis in Successive Decades" (Lantern Slides), which was discussed by Dr. James A. Crabtree, Knoxville, Tennessee.

Dr. Thomas Parran, Jr., Surgeon General, U. S. Public Health Service, and President of the American Public Health Association, Washington, D. C., addressed the Southern Branch.

Dr. Robert Knox Galloway, Director, Williamson County Health Department, Franklin, Tennessee, read a paper entitled "Activities of a County Health Department for One Year" (Lantern Slides), which was discussed by Dr. Allen W. Freeman, Baltimore, Maryland, and Dr. P. M. Chichester, Clarendon, Virginia.

BUSINESS MEETING

Dr. I. C. Riggin, President, called on the Chairman of the Standing Committees to make their reports.

Dr. Leon Banov, Chairman of Finance Committee, was absent. Dr. Warren F. Draper, Chairman of Interstate and Federal Relations Committee, had no report to make. Dr. John W. Brown, Chairman of International Problems Committee, had no report to make.

Dr. G. Foard McGinnes, Chairman of the Meetings and Publications Committee, made the following report: ¶The Committee on Meetings and Publications wishes to express their thanks and appreciation to Mr. C. P. Loranz, Secretary-Manager of the Southern Medical Association, for the cooperation and aid which he has given us in making plans for this meeting. ¶The Committee is indebted to the American Public Health Association for their aid and to each member of this Association for their cooperation. ¶The Transactions of this meeting will be published this year as last. ¶The next annual meeting of the Southern Branch will be held conjointly with the Southern Medical Association in New Orleans, Louisiana, November 30-December 1-2-3, 1937.

Dr. G. Foard McGinnes, Secretary-Treasurer, made the following report: The finances of the Association are in excellent condition and there is a small balance in the Treasury.

The President appointed the following Nominating Committee: Dr. A. T. McCormack, Louisville, Kentucky, Chairman; Dr. E. L. Bishop, Knoxville, Tennessee; and Dr. C. E. Waller, Washington, D. C.

The Nominating Committee reported the following nominations for officers, the nominees being duly elected by vote of the members present:

President—Dr. Victor H. Bassett, Savannah, Georgia.
First Vice-President—Mr. E. S. Tisdale, Charleston, West Virginia.
Second Vice-President—Miss Pearl McIver, Washington, D. C.
Third Vice-President—Dr. Fred W. Caudell, Louisville, Kentucky.
Secretary-Treasurer—Dr. G. Foard McGinnes, Richmond, Virginia.

The Association then adjourned *sine die*.

NATIONAL MALARIA COMMITTEE

Meeting conjointly with the Southern Medical Association.

Officers

Honorary Chairman—Dr. L. O. Howard, Washington, D. C.
Chairman—Dr. Herbert C. Clark, Panama, R. de P.
Chairman-Elect—Dr. W. V. King, Orlando, Florida.
Vice-Chairman—Dr. George E. Riley, Jackson, Mississippi.
Secretary-Treasurer—Dr. Mark F. Boyd, Tallahassee, Florida.

Thursday, November 19, 2:30 p. m.

The nineteenth annual meeting of the National Malaria Committee was begun by a joint scientific session with the American Society of Tropical Medicine in the Fifth Regiment Armory, Assembly Room No. 8, Baltimore, Maryland, Dr. Herbert C. Clark, Chairman of the National Malaria Committee, and Dr. Henry E. Meleney, President of the American Society of Tropical Medicine, presiding.

Dr. E. L. Bishop, Tennessee Valley Authority, Knoxville, Tennessee, read a paper entitled "General Considerations of the Malaria Problem in the Tennessee Valley," which was discussed by Dr. T. H. D. Griffitts, Savannah, Georgia; Dr. J. N. Baker, Montgomery, Alabama; and Dr. L. W. Hackett, Rome, Italy.

Paper by Professor Robert E. Matheson, New York State College of Agriculture, Cornell University, Ithaca, New York, and Mr. H. S. Hurlbut, Cornell University Medical College, Ithaca, New York, entitled "Observations on *Anopheles walkeri*" (Lantern Slides), was read, and was discussed by Mr. George Bradley, Orlando, Florida; Mr. H. A. Johnson, Memphis, Tennessee; and Dr. L. W. Hackett, Rome, Italy.

Dr. S. W. Bohls, State Department of Health, Austin, Texas, read a paper entitled "Two Years' Observation on Malaria Therapy in Texas" (Lantern Slides), which was discussed by Dr. Titus H. Harris, Galveston, Texas, and Dr. J. P. Sanders, Caspiana, Louisiana.

Dr. Rolla B. Hill, International Health Division, Rockefeller Foundation, Lisbon, Portugal, read a paper entitled "The Malaria Problem in Portugal," which was discussed by Dr. L. W. Hackett, Rome, Italy; Dr. W. M. Bispham (Col. M.C., U. S. Army), Baltimore, Maryland; and Dr. Wm. A. Hoffman, San Juan, Puerto Rico.

Dr. James S. Simmons (Major, M.C., U.S.Army), Army Medical Research Board, Ancon, Canal Zone, read a paper entitled "Infections of *Anopheles* (*anopheles*) *punctimacula* and *Anopheles* (*anopheles*) *neomaculipalpus* with Malaria Plasmodia," which was discussed by Dr. Mark F. Boyd, Tallahassee, Florida; Dr. Charles F. Craig, New Orleans, Louisiana; Dr. Herbert C. Clark, Panama, R. de P.; and Mr. Justin Andrews, Baltimore, Maryland.

Dr. L. T. Coggeshall (by invitation), International Health Division, Rockefeller Foundation, New York, New York, read a paper entitled "Rate of Splenomegaly in Experimental Monkey Malaria" (Illustrated), which was discussed by Dr. L. W. Hackett, Rome, Italy.

The Committee then adjourned until 8:00 p. m. Thursday.

Thursday, November 19, 8:00 p. m.

The business session of the Committee was held in the Southern Hotel, Parlor F, Baltimore, Maryland, and was called to order by the Vice-Chairman, Dr. George E. Riley, Jackson, Mississippi, who presided.

The minutes of the 1935 session, held in St. Louis, Missouri, were approved as published in the January, 1936, issue of the Southern Medical Journal.

The Vice-Chairman appointed the following temporary committees: Auditing—Mr. Louva G. Lenert, New York, New York; Mr. Justin Andrews, Baltimore, Maryland; and Dr. J. A. Crabtree, Knoxville, Tennessee. Nominating—Dr. E. L. Bishop, Nashville, Tennessee; Mr. G. E. Bradley, Orlando, Florida; and Mr. Nelson H. Rector, Jackson, Mississippi.

The report of the Secretary-Treasurer showed a total of eighteen honorary and one hundred and forty-eight active members on the roster, a total of one hundred and sixty-six. Since the last meeting five members were lost by death and eight by resignation, while twelve new active members had been elected by the membership sub-committee. Total cash receipts of $283.77, with a balance on hand of $134.33 was reported.

Report of the Sub-Committee on Malaria Prevention Activities, Dr. L. L. Williams, Jr., Chairman, together with the reports from State Health Officers, were presented by Mr. J. L. Robertson, Jr., in the absence of the Chairman, and were filed without reading.

Report of the Sub-Committee on Medical Research, Dr. Charles F. Craig, Chairman, was presented and filed without reading.

Report of Sub-Committee on Engineering was read by the Chairman, Mr. Louva G. Lenert, and the recommendations were discussed. On motion the Secretary was instructed to inform the state health officers of the development of the plans for the publication of the syllabus of lectures on malaria control for engineering students by the American Society of Civil Engineers, and ascertain how many reprints of these would be subscribed for by the several health departments.

The Sub-Committee on Industrial Relations submitted a report by Dr. Craig Barrow, which was discussed by Dr. T. H. D. Griffitts, Mr. J. A. LePrince and Dr. J. N. Baker.

Report of the Sub-Committee on Epidemiology was presented by Dr. George E. Riley and Dr. E. C. Faust, and was discussed by Mr. J. A. LePrince, Dr. T. H. D. Griffitts, Dr. E. C. Faust, Dr. Mark F. Boyd, Dr. J. N. Baker, Mr. Nelson H. Rector, Mr. Justin Andrews and Dr. Craig Barrow.

Report of the Sub-Committee on Statistics, in the absence of the Chairman, was read by the Secretary.

A motion was introduced and carried that a sub-committee, consisting of the new Chairman, the Secretary and Dr. E. C. Faust, New Orleans, Louisiana, prepare an exhibit for the Scientific Exhibits of the Southern Medical Association next year, representing the Committee, and that an amount not exceeding $50.00 be made available for this purpose.

The Sub-Committee on Auditing approved the report of the Secretary-Treasurer, and recommended that an honorarium of $50.00 be allowed his secretary.

The Sub-Committee on Nominations submitted the following nominations for officers, the Secretary being instructed, by motion, to cast the unanimous ballot of the Committee for the nominees:

Honorary Chairman—Dr. L. O. Howard, Washington, D. C.
Chairman—Dr. W. V. King, Orlando, Florida.
Chairman-Elect—Dr. T. H. D. Griffitts, Savannah, Georgia.
Vice-Chairman—Mr. L. M. Clarkson, Atlanta, Georgia.
Secretary-Treasurer—Dr. Mark F. Boyd, Tallahassee, Florida.

The Sub-Committee on Resolutions introduced a resolution of thanks to the management of the Southern Hotel for the courtesies received, and a resolution of regret and condolence on the deaths of the following members, viz., Dr. George E. Bethel, Dr. William Krauss, Dr. Carroll Fox, Dr. Gordon Hastings and Dr. Samuel Benedict.

The Committee then adjourned until 9:00 a. m. Friday.

Friday, November 20, 9:00 a. m.

The Committee met in the Fifth Regiment Armory, Assembly Room No. 8, Baltimore, Maryland, and was called to order by the Chairman, Dr. Herbert C. Clark, Panama, R. de P., who read his Chairman's Address entitled "The First Twelve Months of Infancy as a Test for the Incidence of Initial Attacks of Malaria: A Sixth Annual Report on Some Chagres River Villages," which was discussed by Dr. L. W. Hackett, Rome, Italy.

Dr. Walter C. Earle, Member Field Staff, International Health Division, Rockefeller Foundation, San Juan, Puerto Rico, read a paper entitled "The Relation Between Breeding Area, Anopheles Density and Malaria," which was discussed by Dr. Robert B. Watson, Wilson Dam, Alabama; Col. W. M. Bispham, Baltimore, Maryland; Dr. F. F. Russell, Boston, Massachusetts; and Dr. L. W. Hackett, Rome, Italy.

Paper by Dr. George E. Riley and Mr. Nelson H. Rector, Malaria Control Division, Mississippi State Board of Health, Jackson, Mississippi, entitled "Experience with Minor Drainage in Relation to Malaria Rates in the Mississippi Delta," was read by Dr. Riley, and was discussed by Dr. Mark F. Boyd, Tallahassee, Florida; Dr. F. C. Bishopp, Washington, D. C.; Mr. J. A. LePrince, Memphis, Tennessee; and Dr. Felix J. Underwood, Jackson, Mississippi.

Dr. W. V. King, Bureau of Entomology, U. S. Department of Agriculture, Orlando, Florida, read a paper entitled "On the Occurrence of *Anopheles albimanus* in the United States," which was discussed by Dr. D. P. Curry, Ancon, Canal Zone; Dr. George N. MacDonell, Miami, Florida; Mr. F. H. Stutz, Miami, Florida; Professor Wm. A. Hoffman, San Juan, Puerto Rico; Mr. W. H. W. Komp, Panama, R. de P.; Dr. Rolla B. Hill, Lisbon, Portugal; Dr. H. P. Carr, Havana, Cuba; and Dr. W. C. Earle, San Juan, Puerto Rico.

Dr. Rolla B. Hill, International Health Division, Rockefeller Foundation, Lisbon, Portugal, read a paper entitled "The Length of Life of *Anopheles maculipennis* (var. atroparvus)," which was discussed by Dr. L. W. Hackett, Rome, Italy, and Dr. W. C. Earle, San Juan, Puerto Rico.

Mr. L. E. Rozeboom, Medical Entomologist, Gorgas Memorial Laboratory, Panama, R. de P., read a paper entitled "On *Anopheles albitarsis* Lynch Arribalzaga in Panama," which was discussed by Dr. Mark F. Boyd, Tallahassee, Florida; Mr. W. H. W. Komp, Panama, R. de P.; and Dr. Herbert C. Clark, Panama, R. de P.

Mr. Bruce Mayne, U. S. Public Health Service, Columbia, South Carolina, read a paper entitled "Protracted Incubation in Malaria," which was discussed by Dr. Charles F. Craig, New Orleans, Louisiana; Dr. L. T. Coggeshall, New York, New York; and Dr. L. W. Hackett, Rome, Italy.

A motion was introduced and carried directing the Secretary to send the Committee's greetings to Dr. Frederick L. Hoffman.

The Committee then adjourned *sine die*.

THE AMERICAN SOCIETY OF TROPICAL MEDICINE

Meeting conjointly with the Southern Medical Association.

Officers

President—Dr. Henry E. Meleney, Nashville, Tennessee.
President-Elect—Dr. Herbert C. Clark, Panama, R. de P.
Vice-President—Dr. Alfred C. Reed, San Francisco, California.
Secretary-Treasurer—Dr. N. Paul Hudson, Columbus, Ohio.
Editor—Dr. Charles F. Craig, New Orleans, Louisiana.

Wednesday, November 18, 9:00 a. m. and 2:00 p. m.

The Society met in the Fifth Regiment Armory, Assembly Room No. 9, Baltimore, Maryland, for two scientific sessions, Dr. Henry E. Meleney, President, Nashville, Tennessee, presiding. A special feature of the morning session was the inauguration of the Charles Franklin Craig Lecture on Tropical Medicine which was given by Dr. Ernest Muir of the British Empire Leprosy Relief Association, London, England, who spoke on "The Control of Leprosy." In the afternoon a special group of papers on yellow fever was presented, and a tribute was paid by Dr. Henry E. Meleney to Dr. F. F. Russell, former Director of the International Health Division of the Rockefeller Foundation, for his leadership in yellow fever research and control.

Wednesday, November 18, 7:00 p. m.

The American Academy of Tropical Medicine, meeting with the American Society of Tropical Medicine, held its dinner in the Southern Hotel Banquet Hall. The meeting was addressed by the guest speaker, Dr. Ernest Muir, London, England, his subject being "Recent Progress in Tropical Medicine in India," and by the President, Dr. Richard P. Strong, Boston, Massachusetts.

Thursday, November 19, 12:30 p. m.

The Society held its annual luncheon in the Southern Hotel Banquet Hall, Dr. Henry E. Meleney, President, presiding. The Walter Reed Medal was presented to Mrs. Walter Reed through Major-General Walter L. Reed by Colonel Joseph L. Siler, Medical Corps, U. S. Army, Washington, D. C. The Rockefeller Foundation was awarded the Walter Reed Medal for meritorious achievement in the study and control of yellow fever. The presentation was made by Dr. Richard P. Strong, Chairman of the Committee of Award, Harvard University Medical School, Boston, Massachusetts, to Mr. Raymond B. Fosdick, President of the Rockefeller Foundation, New York, New York. Dr Henry E. Meleney, Nashville, Tennessee, delivered the presidential address, "The Problem of Malaria Mortality in the United States."

Thursday, November 19, 2:30 p. m.

The Society met in joint session with the National Malaria Committee in the Fifth Regiment Armory, Assembly Room No. 8, Dr. Henry E. Meleney, President, American Society of Tropical Medicine, and Dr. Herbert C. Clark, Chairman, National Malaria Committee, presiding.

Friday, November 20, 2:00 p. m.

The last session of the Society was held in the Auditorium of the School of Hygiene and Public Health, The Johns Hopkins University, Dr. Henry E. Meleney, President, presiding. Following a business session of the Society, a scientific program was presented, including a group of papers on yaws and syphilis.

At the business session the following officers were elected for the ensuing year:

President—Dr. Herbert C. Clark, Gorgas Memorial Laboratory, Panama, R. de P.
President-Elect—Dr. Mark F. Boyd, Rockefeller Foundation, Tallahassee, Florida.
Vice-President—Dr. Karl F. Meyer, Hooper Foundation, University of California, San Francisco, California.
Secretary-Treasurer—Dr. N. Paul Hudson, Department of Bacteriology, Ohio State University, Columbus, Ohio.
Editor—Dr. Charles F. Craig, Tulane University School of Medicine, New Orleans, Louisiana.

Councilors—

Dr. Earl B. McKinley, George Washington University School of Medicine, Washington, D. C.
Dr. George W. Bachman, University of Puerto Rico School of Tropical Medicine, San Juan, Puerto Rico.
Dr. Louis L. Williams, Jr., United States Public Health Service, Washington, D. C.
Dr. Thomas T. Mackie, Cornell University Medical College, New York, New York.
Dr. Malcolm H. Soule, University of Michigan School of Medicine, Ann Arbor, Michigan.
Dr. Hamilton H. Anderson, University of California School of Medicine, San Francisco, California.
Dr. Robert A. Lambert, The Rockefeller Foundation, New York, New York.
Dr. James S. Simmons, Headquarters First Corps Area, Army Base, Boston, Massachusetts.

The meeting was adjourned, with the decision to hold the next annual meeting of the Society in conjunction with the annual meeting of the Southern Medical Association in New Orleans, Louisiana, in 1937.

AMERICAN ACADEMY OF PEDIATRICS
Regions 1 and 2

Meeting conjointly with the Southern Medical Association.

Officers

Chairman, Region 1—Dr. Louis C. Schroeder, New York, New York.
Acting Chairman, Region 1—Dr. Philip Van Ingen, New York, New York.
Chairman, Region 2—Dr. Edward Clay Mitchell, Memphis, Tennessee.
Baltimore Committee on Arrangements—Dr. Fred B. Smith, Chairman; Dr. L. Emmett Holt, Jr., Dr. C. Loring Joslin, Dr. J. H. Mason Knox, Jr., and Dr. D. C. Wharton Smith.

Monday and Tuesday, November 16 and 17

The American Academy of Pediatrics, Regions 1 and 2, held a joint meeting at Baltimore, Maryland, meeting conjointly with the Southern Medical Association.

On Monday two clinical sessions were held, at 9:30 a. m. and 2:00 p. m., at the Hurd Memorial Amphitheatre, Johns Hopkins Hospital, ten presentations being made in the forenoon and ten in the afternoon, all by members of the staff of the Hospital.

On Monday at 12:30 noon there was a joint meeting and luncheon of the State Chairmen of each group at the Belvedere Hotel. At 1:00 p. m. there was a luncheon for all visiting pediatrists at the Welch Memorial Library, Johns Hopkins University School of Medicine. At 7:30 p. m. there was the annual banquet at the Belvedere Hotel.

At a business meeting of Region 2, a committee with Dr. Hugh Leslie Moore, Dallas, Texas, as Chairman, was appointed to request a committee from the Council of the Southern Medical Association, the two committees to confer and decide upon a program plan for pediatrics for next year.

Tuesday there was a clinical session beginning at 9:30 a. m. at the Wilson Memorial Amphitheatre, University of Maryland Hospital, eleven presentations being made, all by members of the Hospital staff.

At the conclusion of the above Clinical Session the joint meeting of Regions 1 and 2 adjourned *sine die.*

WOMAN'S AUXILIARY TO THE SOUTHERN MEDICAL ASSOCIATION

Officers

President—Mrs. Oliver W. Hill, Knoxville, Tennessee.
President-Elect—Mrs. Frank N. Haggard, San Antonio, Texas.
First Vice-President—Mrs. S. N. Prunty, Parkersburg, West Virginia.
Second Vice-President—Mrs. Joseph M. Trigg, St. Louis, Missouri.
Recording Secretary—Mrs. C. B. Erickson, Shreveport, Louisiana.
Corresponding Secretary—Mrs. W. A. Shelton, Knoxville, Tennessee.
Treasurer—Mrs. E. W. Veal, South Jacksonville, Florida.
Historian—Mrs. Harvey F. Garrison, Jackson, Mississippi.
Parliamentarian—Mrs. E. V. Caldwell, Huntsville, Alabama.

Wednesday, November 18, 8:00 a. m.

The Pre-Convention Executive Board meeting of the Woman's Auxiliary to the Southern Medical Association was had as a breakfast in Parlor H, Lord Baltimore Hotel, Baltimore, Maryland,

the President, Mrs. Oliver W. Hill, Knoxville, Tennessee, presiding. The breakfast was with the compliments of the Southern Medical Association.

The Invocation was delivered by the President, Mrs. Oliver W. Hill.

Eighteen members of the Executive Board were present. Dr. Seale Harris, of Birmingham, Alabama, and Dr. Oliver W. Hill, Knoxville, Tennessee, members of the Advisory Committee, were guests.

Minutes of the Board meeting, held in Kansas City, May 12, 1936, were read and approved.

The report of the Treasurer, Mrs. E. W. Veal, was read by Mrs. H. E. Christenberry, Knoxville, Tennessee, in the absence of Mrs. Veal. The report showed a balance on hand of $124.27.

Dr. Seale Harris, Birmingham, Alabama, and Dr. Oliver W. Hill, Knoxville, Tennessee, members of the Advisory Committee, spoke on the new organization plan for the Auxiliary indicating that the Auxiliary was a factor in increasing attendance upon the meeting and membership in the Southern Medical Association.

A new Constitution and By-Laws was presented by the Revisions Committee, read by the Corresponding Secretary, Mrs. W. A. Shelton, Knoxville, Tennessee. It was moved by Mrs. A. T. McCormack, Louisville, Kentucky, that the Constitution and By-Laws as presented by the Revisions Committee and as amended, be adopted. The motion was seconded and carried.

Mr. C. P. Loranz, Secretary-Manager of the Southern Medical Association, was introduced by the President, Mrs. Hill. He expressed for himself and for the Council appreciation that the Auxiliary was agreeable to the Council's suggested plan of organization, thus giving the Auxiliary now a plan of organization more similar to that of the Association than they had formerly.

The report of the Chairman of the Research Committee, Mrs. S. A. Collom, Sr., Texarkana, Arkansas, was read by Mrs William Hibbitts, Texarkana, a recommendation of the report being that the Auxiliary allow more funds for the work of the Committee. It was also suggested that the sum of $25.00 be made available to the Jane Todd Crawford Memorial Committee. It was moved and carried that $25.00 be made available to the Chairmen of both the Research Committee and the Jane Todd Crawford Memorial Committee.

The Pre-Convention Executive Board meeting then adjourned *sine die*.

Thursday, November 19, 9:00 a. m.

The thirteenth annual meeting of the Woman's Auxiliary to the Southern Medical Association was held in a Parlor of the Lord Baltimore Hotel, Baltimore, Maryland, and was called to order by the President, Mrs. Oliver W. Hill, who presided.

Rev. T. Guthrie Speers, D.D., Pastor, Brown Memorial Presbyterian Church, Baltimore, Maryland, delivered the invocation.

Mrs. Lewellys F. Barker, Baltimore, Maryland, General Chairman of Entertainment, gave the address of welcome.

Mrs. Joseph Bear, Richmond, Virginia, responded to the address of welcome.

The paper, "In Memoriam," by Mrs. Prentiss Willson, Washington, D. C., was read by Mrs. A. Barnes Hooe, Washington, D. C.

Mrs. W. W. Crawford, Hattiesburg, Mississippi, Chairman of the Auditing Committee, reported that the report of the Treasurer had been audited, the balance on hand being $124.27.

Reports by the following officers were presented and accepted: President, Mrs. Oliver W. Hill, Knoxville, Tennessee; Treasurer, Mrs. E. W. Veal, reported by Mrs. H. E. Christenberry, Knoxville, Tennessee; Corresponding Secretary, Mrs. W. A. Shelton, Knoxville, Tennessee; Historian, Mrs. Harvey F. Garrison, Jackson, Mississippi.

Reports of Standing Committees were presented as follows: Organization, Mrs. Frank N. Haggard, San Antonio, Texas; Custodian of Records, Mrs. A. T. McCormack, Louisville, Kentucky; Press and Publicity, Mrs. L. W. Williams, Savannah, Georgia; Research in Medicine, Mrs. S. A. Collom, Sr., Texarkana, Arkansas, read by Mrs. William Hibbitts, Texarkana, Arkansas; Jane Todd Crawford Memorial, Mrs. C. W. Garrison, Little Rock, Arkansas, read by Mrs. W. T. Wootton, Hot Springs, Arkansas; Revisions, Mrs. J. Buren Sidbury, Wilmington, North Carolina, read by Mrs. W. A. Shelton, Knoxville, Tennessee; Budget, Mrs. T. R. W. Wilson, Greenville, South Carolina.

A roll call of states showed fourteen represented.

Reports of the State Presidents were read, approved and filed.

The Nominating Committee, Mrs. A. T. McCormack, Chairman, Mrs. H. F. Garrison, Mrs. Wm. R. Dancy, Mrs. William Hibbitts, and Mrs. H. E. Christenberry, presented their report, the nominees being elected by acclamation.

President—Mrs. Frank N. Haggard, San Antonio, Texas.
President-Elect—Mrs. Luther Bach, Bellevue, Kentucky.
First Vice-President—Mrs. W. K. West, Oklahoma City, Oklahoma.
Second Vice-President—Mrs. W. T. Wootton, Hot Springs, Arkansas.
Recording Secretary—Mrs. R. H. Clark, Hattiesburg, Mississippi.
Corresponding Secretary—Mrs. H. O. Wyneken, San Antonio, Texas.
Treasurer—Mrs. Chas. P. Corn, Greenville, South Carolina.
Historian—Mrs. B. S. Preston, Charleston, West Virginia.
Parliamentarian—Mrs. Olin S. Cofer, Atlanta, Georgia.

Adjournment was taken at 12:15 to convene again after the luncheon.

Thursday, November 19, 12:30 Noon

At the annual luncheon of the Woman's Auxiliary, Lord Baltimore Hotel, the President, Mrs. Hill, presided.

Greetings were heard from Dr. Fred M. Hodges, Richmond, Virginia, President of the Southern Medical Association; and from Dr. Seale Harris, Birmingham, Alabama, Dr. Arthur A. Herold, Shreveport, Louisiana, and Dr. Oliver W. Hill, Knoxville, Tennessee, members of the Advisory Committee.

Mrs. Harriett Zell Colston, wife of Dr. J. A. C. Colston, Baltimore, and daughter of Dr. Hugh H. Young, Baltimore, rendered a solo.

Dr. W. D. Haggard, Nashville, Tennessee, gave an address.

At this point the Luncheon Session adjourned and the Auxiliary reconvened in business session and was called to order by the President, Mrs. Hill, who presided.

The Budget Committee reported a total planned expenditure for the year 1936-1937 of $175.00, which was adopted.

The newly elected officers were installed by Mrs. Seale Harris, Birmingham, Alabama.

Mrs. Olin S. Cofer, Atlanta, Georgia, Chairman of the Courtesy Resolutions Committee, read the resolutions, which were adopted.

There being no further business the annual meeting of the Auxiliary adjourned to meet in New Orleans, Louisiana, November 30--December 1-2-3, 1937.

COUNCIL, WOMAN'S AUXILIARY TO THE SOUTHERN MEDICAL ASSOCIATION

(All are Members of the Executive Board)

Expire 1937—
Alabama—Mrs. L. W. Roe, Mobile.
Arkansas—Mrs. S. A. Collom, Jr., Texarkana.
District of Columbia—Mrs. Edward L. Morrison, Washington.
Florida—Mrs. E. W. Veal, Jacksonville.
Georgia—Mrs. L. W. Williams, Savannah.

Expire 1938—
Kentucky—Mrs. E. A. Barnes, Albany.
Louisiana—Mrs. C. B. Erickson, Shreveport.
Maryland—Mrs. Lewellys F. Barker, Baltimore.
Mississippi—Mrs. Harvey F. Garrison, Jackson.
Missouri—Mrs. Joseph M. Trigg, St. Louis.
North Carolina—Mrs. J. R. Terry, Lexington.

Expire 1939—
Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia—appointments not yet announced.

STANDING COMMITTEES, WOMAN'S AUXILIARY TO THE SOUTHERN MEDICAL ASSOCIATION

(All are members of Executive Board)

Custodian of Records, Resolutions, Jane Todd Crawford Memorial, Research, Budget and Memorial—appointments not yet announced.

PAST-PRESIDENTS, WOMAN'S AUXILIARY TO THE SOUTHERN MEDICAL ASSOCIATION

(All are members of the Executive Board)

1925, Mrs. E. H. Cary, Dallas, Texas.
1926, Mrs. D. J. Williams, Gulfport, Mississippi.
1927, Mrs. Oscar M. Marchman, Dallas, Texas.
1928, Mrs. A. T. McCormack, Louisville, Kentucky.
1929, Mrs. C. W. Garrison, Little Rock, Arkansas.
1930, Mrs. James N. Brawner, Atlanta, Georgia.
1931, Mrs. S. A. Collom, Sr., Texarkana, Texas.
1932, Mrs. Chas. E. Oates, North Little Rock, Arkansas.
1933, Mrs. A. A. Herold, Shreveport, Louisiana.
1934, Mrs. Southgate Leigh, Norfolk, Virginia.
1935, Mrs. J. Bonar White, Atlanta, Georgia.
1936, Mrs. Oliver W. Hill, Knoxville, Tennessee.

CONSTITUTION AND BY-LAWS OF THE WOMAN'S AUXILIARY TO THE SOUTHERN MEDICAL ASSOCIATION

Adopted at the Annual Meeting of the Auxiliary, Baltimore, Maryland, November, 1936.

CONSTITUTION

Article 1—Name

The name and title of this organization shall be the Woman's Auxiliary to the Southern Medical Association.

Article 2—Object

The object of this Auxiliary shall be: (1) To extend the aims of the medical profession to those interested in the advancement of health and health education; (2) to assist in the entertainment of women attending the annual meeting of the Southern Medical Association; (3) to promote friendliness and good fellowship among the families of the physicians; (4) and to do work approved by the Southern Medical Association.

Article 3—Membership

The members shall be limited to the wives, mothers and unmarried daughters of members, and widows of deceased members, of the Southern Medical Association.

Article 4—Officers

The officers of this Auxiliary shall be a President, President-Elect, two Vice-Presidents, Recording Secretary, Corresponding Secretary, Treasurer, Historian, and Parliamentarian.

Article 5—Executive Board

The officers of the Auxiliary, the Council, Chairmen of the Standing Committees and the Past-Presidents shall constitute an Executive Board to conduct the business of the Auxiliary.

Article 6—Council

The Council shall consist of seventeen members, one from each state from which the Southern Medical Association draws its membership: Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia, to serve three years and not eligible for reappointment, except those drawing the one year term in the beginning. All terms expire with the annual meeting. The Council terms to expire as follows: 1937, Alabama, Arkansas, District of Columbia, Florida and Georgia; 1938, Kentucky Louisiana, Maryland, Mississippi, Missouri and North Carolina; 1939, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia, the first and second groups (expiring 1937 and 1938) to be appointed by the outgoing President and the third group (1939) to be appointed by the incoming President, and thereafter in their order by the incoming President.

Article 7—Meetings

The Auxiliary shall meet at the same time and place as the annual meeting of the Southern Medical Association.

Article 8—Amendments

The Constitution may be amended at any regular meeting of the Auxiliary provided written notice has been sent to each member of the Executive Board not less than two months prior to the annual meeting.

BY-LAWS

Article 1—Dues

There shall be no dues. To meet necessary expenses the Southern Medical Association will consider the Auxiliary budget and appropriate from its funds sufficient amount to meet needed budget expenses, not in excess of $200.00 annually, and in addition the Southern Medical Association will print the proceedings of the annual meeting.

Article 2—Elections

A Nominating Committee shall be named by the Executive Board in annual session to present a list of officers to the general meeting. This committee shall have five members, three to be members of Executive Board, the Chairman to be named by the President from the five members selected. (a) After the report of the Nominating Committee, nominations from the floor shall be in order; (b) the officers shall be elected by ballot at the annual meeting to serve for one year; (c) the Corresponding Secretary shall be appointed by the President; (d) any vacancy occurring in an elective office, except that of President or President-Elect, shall be filled by the Executive Board for the unexpired term; and (e) the Executive Board shall constitute the voting body, ten members being a quorum.

Article 3—Duties of Officers

The duties of officers of the Auxiliary shall be those which usually devolve upon such officers.

Article 4—Standing Committees

The President shall appoint the following Standing Committees: Custodian of Records; Resolutions; Jane Todd Crawford Memorial; Research; Budget; Memorial, and such other committees as she may deem advisable.

Article 5—Amendments

The By-Laws may be amended at any regular meeting of the Executive Board, or at the annual meeting of the members by a two-thirds vote of the members present, provided such amendments do not conflict with the spirit of the Constitution.

Article 6—Parliamentary Authority

The rules contained in Roberts "Rules of Order, Revised" shall govern in all cases to which they are applicable.

THE AFTER-BALTIMORE CRUISE AND TOUR

The Southern Medical Association sponsored an official, personally conducted, all-expense, cruise in historic Maryland and Virginia waters and tour on the historic Virginia peninsula following the Baltimore meeting.

The party left Baltimore on Friday evening, November 20, at 6:30, on the S.S. President Warfield of the Baltimore Steam Packet Company (Old Bay Line). The President Warfield is the largest, newest and most modern ship in the Baltimore-Norfolk service. Dinner Saturday evening was had aboard ship.

The ship arrived at its Norfolk dock Saturday morning at 6:30 and left at 8:00 o'clock, cruising back up the Elizabeth River, through Hampton Roads, into and up Chesapeake Bay, into and up the York River to Yorktown, Virginia, arriving there at 11:30 a. m.

On the cruise from Norfolk to Yorktown the ship passed large docks; the U. S. Naval Hospital; U. S. Naval Base; Fort Monroe; the place where the memorable battle between the Merrimac and Monitor was fought in 1862; ships at anchor and ships coming into Norfolk. The weather was delightfully cool, the sun shone brightly, and all could be on deck, thus making for a pleasant cruise.

At Yorktown very modern busses were in waiting and the party got off at once for a tour of the historic peninsula of Virginia, "The Cradle of the Nation." Each bus had a guide-lecturer for the whole tour, and for the seven-mile ride over historic and hallowed ground at Yorktown each bus had a ranger guide-lecturer, courtesy of Mr. B. Floyd Flickinger, Superintendent, Colonial National Monument, National Park Service.

A stop was made at the Nelson House, now called York Hall, the home in 1781 of General Thos. Nelson, Jr., who was Commander of the Virginia Militia, a war governor of Virginia and a signer of the Declaration of Independence. The house is original and not a restoration and contains some of the original furnishings, all the furnishings being of the period. The grounds and formal gardens are kept as they were originally. Of special interest were the cannon balls, lodged in the walls of the house, which were fired from the British ships in the harbor during the siege of 1781. ¶A stop was made at the Moore House, where the terms of the Cornwallis surrender were drawn up by those representing Washington and Cornwallis, the surrender that gave the United States her independence. ¶The Victory Monument, commemorating the surrender of Cornwallis in 1781, erected by the United States Government; the old Swan Tavern (restoration), the Old Custom House, the first in the United States and built in 1706; and the Grace Episcopal Church, restored on the foundations of the original church built in 1679; were passed in the ride in and around Yorktown.

From Yorktown to Williamsburg the ride for a portion of the way was over the new and uncompleted Memorial Highway along the York River, furnishing a splendid view of that beautiful body of water.

Arriving at Williamsburg at 1:00 p. m., the group had lunch at the Williamsburg Inn, Miss Dorothy McGinnes, Manager. Following lunch the party visited the following places* in Williamsburg, being handled in two units, each in charge of an official guide or hostess:

THE CAPITOL, 1699-1705 (Restored)

"This structure, closely identified with the political life of Colonial Virginia, has been rebuilt on original foundations as the earlier of two buildings that stood here during the Eighteenth Century. Its furnishings and unusual interior painting conform to descriptions in contemporary records."

THE GOVERNOR'S PALACE, 1710-1715 (Restored)

"The palace and its dependencies, preeminent among notable estates in colonial America, have been rebuilt on original foundations. Although only partially furnished, many rooms are of special interest because of the rare old Chinese wall paper, antique furniture and other furnishings that have been chosen to conform with inventories of royal governors. The gardens are considered more typical of formal Eighteenth Century English gardens than any others in America."

THE RALEIGH TAVERN, 1742 (Restored)

"One of the most historic taverns of colonial America, this building has been reconstructed on original foundations. Its antique furniture and furnishings were selected on the basis of inventories of its early keepers."

THE WREN BUILDING, 1675 (Restored)

"This is the oldest academic building in America, one of the three historic buildings of the College of William and Mary that have been restored and are now used by the College."

THE PUBLIC GAOL, 1701-1704 (Restored)

"This building dates from the beginning of the Eighteenth Century and has been restored on original foundations. It includes part of the original structure. The findings of archaeological and documentary research furnished a very complete record for guidance in restoring this unusual structure."

BRUTON PARISH CHURCH, 1710-1715

"Closely linked with the city's history, this edifice dates from 1715, at which time it was completed on the site of an earlier church. To be restored."

The buildings of the Williamsburg Restoration have been restored to their Eighteenth Century splendor by Mr. John D. Rockefeller, Jr. Any one of the buildings of the Restoration at Williamsburg is worth going there to see, but of especial interest are the Capitol, the Governor's Palace and the Wren Building of the College of William and Mary. The formal garden at the Governor's Palace alone is worth going miles to see.

Leaving Williamsburg in the late afternoon, as twilight was approaching, the party was taken to Jamestown where the first settlers landed on May 13, 1607, the beginning of our National history. Of especial interest were the monuments to John Smith and Pocahontas, and the old Jamestown Church, the first Protestant Church in America, the original tower of which still stands. Standing on this hallowed ground the party was privileged to look across the wide and placid James River and see a beautiful sunset.

Leaving Jamestown just at nightfall, the party was taken directly to the Mariner's Museum near Newport News, which was founded by Mr. Archer M. Huntington in 1930 as a repository for marine activities. Through the courtesy of the Superintendent, Mr. J. T. Holzbach, the Museum was kept open especially for this party. Here was seen almost everything one may think of concerning ships and the sea as well as a library of more than eleven thousand volumes on maritime and sea subjects. Of particular interest were the old figure heads, these alone being worth a visit to the Museum. The Museum is the only one of its kind in this country.

From the Mariner's Museum the party proceeded on into Newport News where dinner was had at the Warwick Hotel. Mr. J. Basil Sawyer, Manager.

*Descriptions of the buildings and places visited were taken from a copyrighted folder entitled "Williamsburg, Virginia: The Restored Colonial City," issued by the Williamsburg Restoration, Inc., and used by permission.

After dinner the party went on to Old Point Comfort, driving through the old and new Fort Monroe, seeing the old moat around the Fort filled with water just as when it was built many years ago; also modern fortifications with the large modern guns.

The party boarded the cruise ship, the President Warfield, at Old Point Comfort, at 9:00 p. m. and arrived back at Baltimore Sunday morning, November 22. Breakfast was had aboard ship.

And here ended the After Baltimore Cruise and Tour.

The cruise and tour, two nights and one day from Baltimore, was all-expense on a basis of $20.00 plus the stateroom accommodations, the ship having different types of staterooms at varying prices. There were fifty-five (55) persons on the cruise and tour.

Mr. C. P. Loranz, Birmingham, Alabama, Secretary-Manager of the Southern Medical Association, was in charge of the party. Mr. R. L. Jones, Baltimore, Maryland, General Passenger Agent of the Baltimore Steam Packet Company (Old Bay Line), accompanied the party. The busses were furnished by the Norfolk Southern Bus Corporation, Norfolk, Virginia.

Book Reviews

Continued from page 103

The Thyroid: Surgery, Syndromes, Treatment. By E. P. Sloan, M.D. Edited by Members of the Sloan Clinic, Guy A. Sloan, M.D.; H. P. Sloan, M.D.; Frank Deneen, M.D.; H. W. Wellmerling, M.D.; and O. H. Ball, M.D. And with a foreword by Wm. Seaman Bainbridge, M.D. 475 pages, illustrated. Springfield, Illinois: Charles C. Thomas, 1936. Cloth, $10.00.

"The Thyroid: Surgery, Syndromes, Treatment," by the late E. P. Sloan, edited by his associates of the Sloan Clinic, is a work of wider scope than one usually finds in mongraphs on the thyroid gland.

The volume reflects the experience of the author and his associates in dealing with some 20,000 cases of goiter, more than 15,000 of which came to operation. The anatomy, physiology, chemistry and pathology of the thyroid gland; the etiology, prophylaxis and classification of goiter; the diagnosis and treatment of the different types, and the technic of thyroidectomy are all presented in a clear and pleasing manner.

An interesting chapter is devoted to a consideration of those conditions in which nervousness, tachycardia, dyspnea and other symptoms of nervous instability may cause confusion. In some of these, hyperthyroidism may be overlooked, while in others the thyroid may be thought to be the cause of the disturbance and some other condition which is the seat of the trouble may be overlooked. An outline of differential study of such cases is given.

Prognosis in the different types of goiter is likewise discussed in great detail.

In the chapter on "Non-Surgical Treatment" due consideration is given to dietetic, hygienic and climatic adjuncts and the effects of iodine and other medicinal agencies are discussed.

The employment of x-ray and radium is restricted to a very limited field, principally as palliatives in severe thyrotoxicosis, in malignancy too far advanced for operation, and in the postoperative treatment of malignancy.

In the chapters dealing with operative treatment, anesthetics and analgesics are fully discussed. The chap-

ter on surgical anatomy and operative technic are clearly written and beautifully illustrated.

Chapter 15 is devoted to postoperative management and is most valuable. The recognition and management of postoperative complications is discussed in detail. Every operating surgeon, every surgical intern and resident should familiarize himself with the views presented in this chapter.

Separate chapters are devoted to hypothyroidism, the parathyroids, and the thymus.

In concluding the work there is an interesting chapter dealing with the history of the thyroid from earliest times; another on nomenclature and classification; and a bibliography of 254 references.

A Manual of Pharmacology and Its Applications to Therapeutics and Toxicology. By Torald Sollmann, M.D., Professor of Pharmacology and Materia Medica in the School of Medicine of Western Reserve University, Cleveland. Fifth Edition. 1190 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1936. Cloth, $7.50.

Dr. Sollmann, by frequent editions, has kept his book abreast of the rapid advances that are taking place in the field of pharmacology. This edition complies with the changes made in the U.S.P. XI. The same general scheme of presentation and indexing is followed as in previous editions. Among the more important topics revised are the amebicides, sex hormones, cyanide antidotes, hypnotics, ephedrine, histidine, oxygen therapy, sodium morrhuate, atebrine in malaria, cyclopropane and dinitrophenol. The work is one of the great handbooks of pharmacology and toxicology.

Southern Medical News

ALABAMA

Dr. Seale Harris, Jr., formerly Assistant Professor of Medicine, Vanderbilt University School of Medicine, Nashville, Tennessee, announces his association with his father, Dr. Seale Harris, Sr., Birmingham.

Dr. William R. Meeker, Mobile, has been made Chairman of the Gulf Coast Clinical Society for the coming year.

Dr. Walter A. Minsch, formerly of Athens, has moved to Kerrville, Texas.

Dr. Cecil J. Vaughn, formerly of Lexington, Mississippi, has moved to Fort Payne.

Dr. William R. Britton, formerly of Anniston, has moved to Montgomery.

Deaths

Dr. Toll H. Sudduth, Hanceville, aged 49, died October 14 of injuries received in an automobile accident.

Dr. Jesse Lee Prince, Stevenson, aged 61, died September 29 of cerebral hemorrhage and arteriosclerosis.

Dr. J. B. Moxley, Brantley, aged 59, died October 30.

ARKANSAS

The First Councilor District Medical Society has elected the following officers for the coming year: Dr. J. C. Land, Walnut Ridge, President; Dr. F. L. Husband, Blytheville, Vice-President; Dr. F. D. Smith, Blytheville, Secretary.

The Prairie County Medical Society has elected the following officers for the coming year: Dr. William Parker, DeValls Bluff, President; Dr. Luke Parker, DeValls Bluff, Vice-President; Dr. J. G. Gilliam, Des Arc, Secretary-Treasurer.

Dr. A. A. Blair, Fort Smith, has been made Surgeon of the Veterans of Foreign Wars, Fort Smith Post.

Dr. B. B. Bruce, Alma, was recently made Coroner of Crawford County.

Dr. Glenn H. Johnson, Little Rock, has been made a Fellow of the American College of Surgeons.

Dr. F. H. Krock, Fort Smith, has been doing postgraduate work in Massachusetts.

Dr. T. Duel Brown, Little Rock, has been doing postgraduate work in Rochester, Minnesota.

Dr. J. C. Pate, formerly of Leslie, has moved to Olney Springs, Colorado.

Dr. W. W. Brown, formerly of Williford, has moved to Hardy.

Dr. Roy Millard, formerly of Dardenelle, has moved to Russellville.

Deaths

Dr. Samuel Thomas Tapscott, Searcy, aged 51, died September 4.

DISTRICT OF COLUMBIA

The Washington Medical and Surgical Society has elected the following officers for the coming year: Dr. J. Duerson Stout, President; Dr. Joseph Horgan, Vice-President; Dr. Robert Oden, Secretary; Dr. Frank E. Gibson, Treasurer.

Dr. Tom A. Williams, formerly of Washington, has moved to Tunbridge Wells, England.

Dr. Edmund Murdaugh Ellerson, Washington, and Miss Elsie Boyd Tucker were married September 26.

Deaths

Dr. William Henry MacKay, Washington, aged 45, died October 14 of pulmonary tuberculosis.

Dr. Owen Joseph Mink, Washington, aged 57, died October 21 of coronary thrombosis.

Dr. DeWitt Kluttz, Washington, aged 47, died September 8 of coronary thrombosis.

Dr. Robert Lee Cole, Washington, aged 76, died November 10.

FLORIDA

Dr. M. A. Lischkoff, Pensacola, has been made Secretary-Treasurer of the Gulf Coast Clinical Society for the coming year.

Dr. George E. Beckman, Jacksonville, was recently made a Fellow of the International College of Anesthetists.

Dr. Charles E. Boynton, Jr., West Palm Beach, has moved into the Comeau Building.

Dr. Walter C. Jones, Miami, has returned after doing postgraduate work in the East.

Dr. R. R. Sullivan, Lakeland, has returned after doing postgraduate work in Rochester, Minnesota.

Dr. Frank S. Whitman, West Palm Beach, has been doing postgraduate work in Asheville, North Carolina.

Dr. R. Sam Mosley, Miami, has opened offices in the Seybold Building.

Dr. Jess V. Cohn, Hollywood, has moved into the Central Arcade.

Dr. N. C. Pintado, formerly of Key West, has moved to Miami.

Dr. Francis Emory Bell, Palatka, and Miss Lourline Seyden were married November 8.

Deaths

Dr. Arthur H. Reading, Lake Worth, aged 73, died October 1 of endocarditis.

Dr. Edwin Augustus Clarke, Winter Park, aged 73, died October 3 of cerebral hemorrhage.

Dr. James Alexander West, Winter Haven, aged 70, died September 18 of carcinoma of the prostate.

Dr. Mary Belle Hancock, Clearwater, aged 75, died October 2 of cerebral hemorrhage.

Dr. Robert R. Hourigan, St. Augustine, aged 72, died September 3.

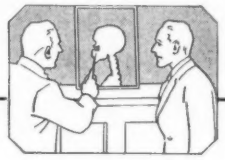
Dr. William Edgar Hover, Sarasota, aged 79, died September 27.

Dr. Charles Howard Lodor, Eustis, aged 77, died October 2.

GEORGIA

Dr. Kennon Christian Walden, Waycross, and Miss Anne Lilbourne Gravatt were married October 22.

Continued on page 28



Use of Correct Intensifying Screens

MAKES BIG DIFFERENCE IN RESULTS

LEADING roentgenologists agree that today the careful selection of intensifying screens is more important than ever before.

Experience has proved that roentgenologists cannot fully satisfy today's extremely exacting requirements in making negatives, nor obtain from highly developed modern X-ray equipment the finest work which it is capable of producing . . . unless intensifying screens of exactly the right type, and of highest quality, are used for each individual job.

To assure the best results in each case, it is necessary not only to select an intensifying screen which is suited to the X-ray apparatus used, but one which has the correct speed and will produce the desired quality at that speed.

If you are not acquainted with the comprehensive variety of screens made available by Patterson to meet each individual need we are confident it would pay you to investigate. Your dealer will gladly give you complete data.

NEW AND HELPFUL INFORMATION

The following new Patterson Leaflets are now available: (1) Cassette Contact; (2) Care of Intensifying Screens; (3) Patterson Mounting Paste and Method of Mounting Intensifying Screens. Send for any in which you are interested.

THE PATTERSON SCREEN CO., TOWANDA, PA.

Patterson

X-RAY

INTENSIFYING **Screens** FLUOROSCOPIC

SCREEN SPECIALISTS FOR MORE THAN TWENTY YEARS

Harvard Medical School Courses for Graduates

GENERAL COURSE IN INTERNAL MEDICINE

April and May at the BOSTON CITY HOSPITAL;

June at the PETER BENT BRIGHAM HOSPITAL;

July at the MASSACHUSETTS GENERAL HOSPITAL;

and repeated in the same order beginning August 1st.

The course is arranged for practicing physicians who can give from one to four months to a comprehensive review of internal medicine.

FEE $150 per month

Apply to Assistant Dean, Courses for Graduates, HARVARD MEDICAL SCHOOL, Boston, Massachusetts.

Continued from page 132

Dr. Myron B. Allen, Hoschton, and Miss Ruth Lott were married recently.

DEATHS

Dr. William Parmilee Williams, Blackshear, aged 69, died September 24.

Dr. J. Beal Powers, Macon, aged 74, died September 16 of arteriosclerosis.

Dr. David M. Wheelis, Columbus, aged 74, died October 9 of cerebral hemorrhage.

Dr. Wallace W. Norris, Atlanta, aged 65, died October 19.

Dr. Berry Hayden Smith, Blythe, aged 54, died September 27 of injuries received in an automobile accident.

Dr. William Isham Hailey, Hartwell, aged 66, died October 15 of uremia.

KENTUCKY

The Kentucky State Medical Association has elected the following officers for the coming year: Dr. J. D. Northcutt, Covington, President; Dr. H. G. Reynolds, Paducah, President-Elect; Dr. J. H. Pritchett, Louisville, Dr. H. V. Usher, Sedalia, and Dr. Branham Baughman, Frankfort, Vice-Presidents; Dr. A. T. McCormack, Louisville, Secretary; Dr. Marshall McDowell, Cynthiana, Treasurer.

Dr. Paul Mapother, formerly of Louisville, has moved to Black Mountain.

DEATHS

Dr. James Louis Early, Owensboro, aged 69, died September 11.

Dr. Richard B. Cassady, LaGrange, aged 92, died October 10.

Dr. William R. Callihan, Prestonsburg, aged 60, died September 25.

Dr. George S. Calloway, Wallins Creek, aged 68, died September 28 of diabetes mellitus.

Continued on page 30

THE NEW YORK POLYCLINIC

MEDICAL SCHOOL AND HOSPITAL

(ORGANIZED 1881)

(*The Pioneer Post-Graduate Medical Institution in America*)

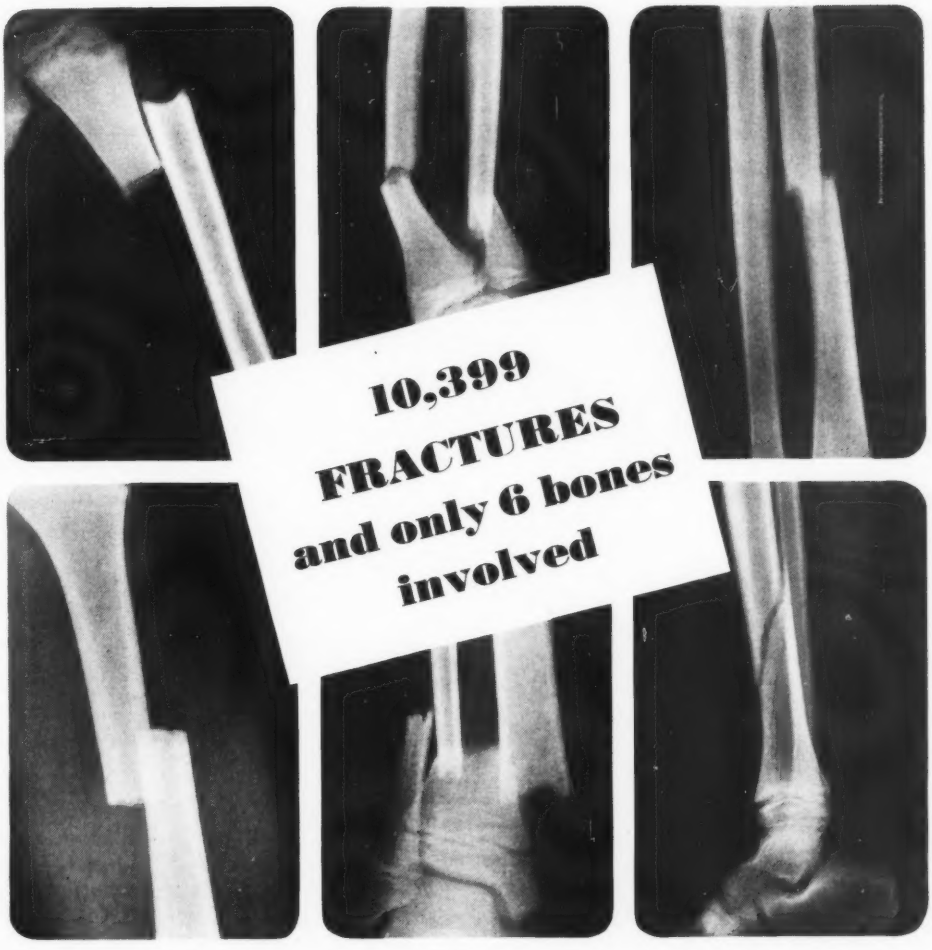
EYE, EAR, NOSE and THROAT

UROLOGY

Surgical Anatomy
Urologic Operations
Diagnosis and Office Treatment
Regional Anesthesia
Proctology
Neurology
Operative Urology (cadaver)
Cystoscopy and Endoscopy
Dermatology and Syphilology
Diathermy
Pathology
Roentgenology

FOR INFORMATION ADDRESS

MEDICAL EXECUTIVE OFFICER: 345 West 50th Street, NEW YORK CITY



AN overwhelming percentage of fractures encountered in everyday practice may be placed under the heading "ordinary." But whether the condition be ordinary or unusual, accepted diagnostic procedure requires x-ray examination—first, to determine definitely the site of the fracture—then, to check up on the effect of reduction.

Dislocations usually are obvious, but a satisfactory knowledge of the area involved depends upon the radiographic findings before and after reduction. Confirmation or dismissal of possible associated fractures which otherwise might be overlooked also should be based upon comprehensive x-ray examination.

For the fullest protection of physician and patient alike, the safe course in management of any fracture or dislocation starts with radiographs made by a competent radiologist • Eastman Kodak Company, *Medical Division*, Rochester, N. Y.

Radiographs
Provide Diagnostic Facts

Norris
Clinical Laboratories

JACK C. NORRIS, M.D., Director

Pathology, Clinical Pathology, Medico-legal Medicine.

Blood Cultures. Spinal fluids. Kahn and Lewis tests for syphilis. Frei tests for lymphogranuloma. Aschheim-Zondek test for pregnancy (early morning specimen 3 ounces, urine sterile bottle needed), report 24 hours later or earlier if desired. Diagnosis of cancer by frozen section, immediate report by telegram, with grading of tumor by Broders method. Blood chemistry, calcium, phosphorous, etc. Complete blood studies for blood dyscrasias of all types. Vaccines for boils, colitis and arthritis. Special media furnished for streptococcal infections. Agglutination tests for diagnosis of obscure fevers (typhus, undulant, typhoid, etc.). Autopsies performed by appointment with chemical tests for poisons when needed.

Address

DR. JACK C. NORRIS

Phone Walnut 6057 810 Doctors Bldg.

ATLANTA, GA.

Continued from page 28

Dr. William Ferguson Peebles, Clinton, aged 58, died September 11 of carcinoma of the pancreas.

LOUISIANA

Dr. Alton Ochsner, New Orleans, was made a Regent at the meeting of the American College of Surgeons in Philadelphia recently.

DEATHS

Dr. Edward F. Luckett, Cheneyville, aged 61, died September 29 of coronary occlusion and hypertension.

Dr. Benjamin Talbot Ferguson, Jamestown, aged 57, died September 13.

Dr. Benjamin Augustus Littell, Opelousas, aged 70, died September 4.

Dr. John Davidson Hunter, Rayne, aged 60, died September 16 of cerebral hemorrhage.

MARYLAND

Dr. J. Mason Hundley, Jr., Baltimore, has been appointed a member of the Council of the Southern Medical Association from Maryland for a regular Council term of five years, the appointment having been announced recently by the President, Dr. Frank K. Boland, Atlanta. Dr. Hundley succeeds Dr. Edward A. Looper, Baltimore, who, having served the constitutional limit, was not eligible for reappointment.

Dr. Alan M. Chesney, Baltimore, has been made President-Elect of the Association of American Medical Colleges.

Dr. Arthur M. Shipley and Dr. Louis P. Hamburger have been appointed Consultants to the Baltimore City Health Department.

Dr. W. Raymond McKenzie, Baltimore, has moved into the Medical Arts Building.

Dr. Richard B. Dunn, formerly of Baltimore, has moved to Greensboro, North Carolina.

Continued on page 32

ACID RESISTANCE WITH KALAK

Hypertonic — Alkaline — Carbonated — Not Laxative

The years of experience with physicians who have used Kalak show that the use of a formula containing calcium, magnesium, sodium and potassium salts represents a correctly balanced solution. This is Kalak which, as such, aids in maintaining a balanced base reserve.

How Alkaline Is Kalak?

One liter of Kalak requires more than 700 cc. N/10 HCl for neutralization of bases present as bicarbonates. Kalak is capable of neutralizing approximately three-quarters its volume of decinormal hydrochloric acid.

KALAK WATER CO. OF NEW YORK, Inc.

6 CHURCH STREET NEW YORK CITY

Kalak

Rapid Induction

TRADE MARK

VINETHENE

(Vinyl Ether Merck)

Rapidity of induction and recovery, and rarity of nausea or vomiting characterize Vinethene Anesthesia.

ESPECIALLY USEFUL FOR

INDUCTION • SHORT OPERATIONS • OBSTETRICS • DENTISTRY •

MERCK

PROFESSIONAL LITERATURE ON REQUEST

MERCK & CO. Inc. RAHWAY, N. J.

Manufacturing Chemists

"Puritan Maid"
Cyclopropane
Nitrous Oxid
Ethylene
Oxygen
Carbon Dioxid
Percentage Mixtures of Carbon Dioxid and Oxygen

Oxygen Says:

"During the past few years I have become an increasingly important factor to the Medical Profession. I am now being used pre-operatively, post-operatively, in pneumonia, asthma, chronic heart conditions, etc. BUT, to do my best work therapeutically, I must be administered immediately following diagnosis, and continued until I have completed my task."

One of the most effective means for the administration of Oxygen in prolonged cases is the Nasal Catheter method—used and recommended by Doctors who have made a study of the value of Oxygen therapy.

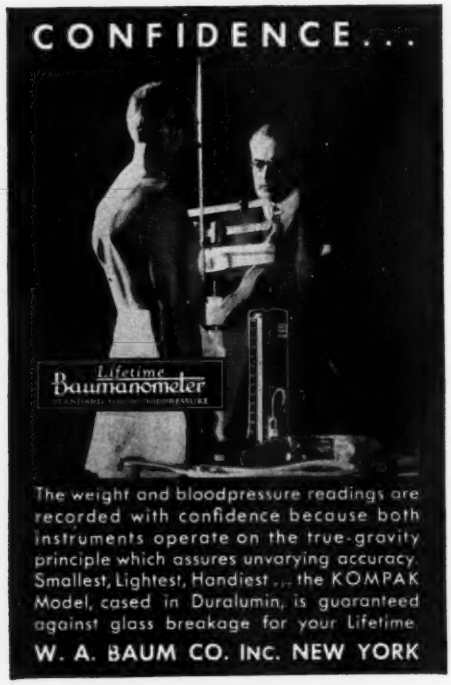
Our PURITAN NASAL CATHETER OUTFIT, as shown, is efficient, economical, portable, and durable. We have installed this equipment in many of the leading hospitals over the entire country. We call your particular attention to the pressure-reducing regulator with which this unit is equipped, which is of the highest quality. A high-pressure gauge shows contents of cylinder, and an accurate working-pressure gauge registers flow in litres per minute, with positive control.

Puritan Nasal Catheter Outfits - Leading Makes of Oxygen Tents - Bedside Inhalation Units. For Sale or Rental at All of Our Locations.

All Types of Anesthetic Gas Machines, Resuscitators and Inhalators - Wilson Soda Lime.

Puritan Compressed Gas Corp.

CINCINNATI ST. LOUIS ST. PAUL DETROIT
KANSAS CITY CHICAGO CAMBRIDGE BALTIMORE


CONFIDENCE...
Lifetime
Baumanometer
The weight and bloodpressure readings are recorded with confidence because both instruments operate on the true-gravity principle which assures unvarying accuracy. Smallest, Lightest, Handiest ... the KOMPAK Model, cased in Duralumin, is guaranteed against glass breakage for your Lifetime.
W. A. BAUM CO. INC. NEW YORK

Continued from page 30

Dr. Reba M. Lowe, Reisterstown, and Dr. Eugene Paul Campbell were married October 3.

Deaths

Dr. Martin Andrew O'Neill, Baltimore, aged 61, died September 9 of chronic nephritis.

Dr. James Albert Zepp, Baltimore, aged 80, died October 6 of arteriosclerosis and chronic nephritis.

Dr. Richard C. Wells, Baltimore, aged 94, died October 1 of senility and bronchitis.

Dr. George Alex MacCallum, Baltimore, aged 93, died September 30.

Dr. I. Herbert Tobias, Hancock, aged 62, died October 2 of angina pectoris and multiple sclerosis.

MISSISSIPPI

The Southern Surgical Association met in Edgewater Park, December 15-17.

Dr. Cecil J. Vaughn, formerly of Lexington, has moved to Fort Payne, Alabama.

Dr. D. L. Anderson, formerly of Catawba Sanatorium, Virginia, has moved to Sanatorium.

Dr. R. M. Bostwick, Jr., formerly of Poplarville, has moved to Indianola.

Dr. Rowland W. Hall announces his association with Dr. James Grant Thompson, Jackson.

Dr. Altus B. Harvey and Mrs. Inez Sylverstein Whittle, both of Tylertown, were married November 7.

Deaths

Dr. Samuel Rankin Ratliff, Vancleave, aged 63, died September 16 of carcinoma of the stomach.

Dr. John Ford Burnet Benton, Valley Park, aged 67, died September 29 of diabetes mellitus.

MISSOURI

Dr. Alphonse McMahon, St. Louis, has been appointed a member of the Council of the Southern Medical Association from Missouri for a regular Council term of five years, the appointment having been announced recently by the President, Dr. Frank K. Boland, Atlanta. Dr. McMahon succeeds Dr. M. Pinson Neal, Columbia, who, having served the constitutional limit, was not eligible for reappointment.

Dr. William T. Coughlin, St. Louis, was recently honored at a dinner given by the St. Louis University School of Medicine in recognition of his completion of twenty-five years' service on the faculty of the University.

Dr. Eldred K. Musson, formerly of Jefferson City, has moved to Kansas.

Dr. Clarence Samuel Branson and Miss Audeen Mervin, both of St. Joseph, were married recently.

Deaths

Dr. John Lincoln Robinson, Kansas City, aged 75, died October 12 of pneumonia.

Dr. James M. Miller, Montrose, aged 72, died October 6 of coronary thrombosis.

Dr. Wilbur Fisk McConkey, St. Louis, aged 71, died September 20.

Dr. Benjamin F. Wilson, Golden City, aged 76, died September 15 of cerebral hemorrhage and arteriosclerosis.

Dr. Albert John Kraft, Webster Groves, aged 62, died September 24 of cerebral hemorrhage.

Dr. David F. Morton, Perryville, aged 78, died September 4 of carcinoma of the bile ducts and myocarditis.

Dr. Forrest A. Harrison, Springfield, aged 40, died recently of pneumonia.

Dr. William O. Pool, Stoutland, aged 65, died August 18.

NORTH CAROLINA

Dr. Hamilton W. McKay, Charlotte, has been appointed a member of the Council of the Southern Medical Association from North Carolina for a regular Council term of five years, the appointment having been announced recently by the President, Dr. Frank K. Boland, Atlanta. Dr. McKay succeeds Dr. Paul H. Ringer, Asheville, who, having served the constitutional limit, was not eligible for reappointment.

The North Carolina Eye, Ear, Nose and Throat Society has

Continued on page 34

BROADER KNOWLEDGE · · ·

· · · INCREASED POTENCY

ORETON—MALE SEX HORMONE

Broader knowledge resulting from recent investigations in the field of male sex hormone therapy has enabled us to increase the potency and effectiveness of Oreton.

Oreton now contains crystalline "propionic acid ester of testosterone" in a solution of oil.

Testosterone is the true male hormone originally isolated from testicular tissue, and now synthetically produced in our Bloomfield, N. J., laboratories. The most effective form of this hormone, thus far obtained, is the propionate. When testosterone propionate is deposited in the muscular tissue, the hormone is gradually released, resulting in protracted, and hence more effective, action.

Reports from clinical investigators indicate favorable results in infantilism, hypogonadism, impotence, prostatic hypertrophy, and certain other types of sexual deficiencies.

Improved manufacturing technique has enabled us to reduce prices.

Please communicate with the Medical Research Division to discuss your cases.

CONCENTRATIONS AND PACKAGES

ORETON* (propionic acid ester of testosterone in a solution of oil)	
1.0 mgm., per 1 c.c. amp.	Boxes of 6 ampules
2.5 mgms., per 1 c.c. amp.	Boxes of 3 and 6 ampules
5.0 mgms., per 1 c.c. amp.	Boxes of 3 ampules

*Trade Mark Reg. U. S. Pat. Off.

Copyright 1937, Schering Corporation

SCHERING CORPORATION

BLOOMFIELD, NEW JERSEY

Start the New Year Right by Recommending

HORLICK'S as a Nutritious, Digestible Diet,

ESPECIALLY USEFUL

1. For infants and growing children.
2. For nursing mothers.
3. In digestive disorders.
4. During fevers and convalescence.
5. For sleeplessness.

We invite you to listen to
LUM and ABNER
Every night except Sat. and Sun.
NBC Blue Network

HORLICK'S MALTED MILK CORP.
Racine, Wis.

For excellent therapeutic results in

Whooping Cough

Southern Doctors Prescribe

ELIXIR BROMAURATE

ELIXIR GOLD TRIBROMIDE

ELIXIR BROMAURATE cuts short the duration of the illness, reduces the frequency of the attacks, relieves the distressing cough and gives the child rest and sleep.

ELIXIR BROMAURATE is prescribed routinely by experienced physicians in all COUGH DISORDERS with gratifying results. Also valuable in the cough of PULMONARY TUBERCULOSIS and in BRONCHITIS and BRONCHIAL ASTHMA.

ELIXIR BROMAURATE is a standard, assayed and palatable preparation. In four-ounce original bottles; the dosage is a teaspoonful 3 to 4 times a day after meals or more often when necessary.

✓ **DOCTOR:**—We will be glad to send you a valuable booklet on "Gold in the Treatment of Whooping Cough and other Diseases". Kindly drop us a line.

GOLD PHARMACAL CO., New York

Continued from page 32

elected the following officers for the coming year: Dr. J. M. Lilly, Fayettesville, President; Dr. Casper W. Jennings, Greensboro, Vice-President; Dr. Frank Smith, Charlotte, Secretary.

The Seventh District Medical Society has elected the following officers for the coming year: Dr. McG. Anders, Gastonia, President; Dr. Ben Gold, Shelby, Vice-President; Dr. C. H. Pugh, Gastonia, Secretary.

Dr. Samuel Harry Justa, Macclesfield, and Miss Eva Feldman were married October 25

DEATHS

Dr. Thomas Craig Redfern, Winston-Salem, aged 44, died October 16 of coronary thrombosis.

Dr. Alfred Salls, Oxford, aged 87, died September 19 of multiple neuritis.

Dr. J. Ernest Dowdy, Sandy Ridge, aged 50, died September 19 of carcinoma of the left axilla due to roentgen ray burns.

Dr. Benjamin W. Best, Greensboro, aged 75, died September 24 from injuries received in an automobile accident.

Dr. Henry Wilkins Lewis, Jackson, aged 80, died October 19.

Dr. Orrin P. Maxson, Weaverville, aged 81, died September 28 of duodenal ulcer and cystitis.

Dr. Alsey R. Fuller, Mountville, aged 82, died October 9.

OKLAHOMA

Dr. LeRoy Long, Oklahoma City, has been made a member of the Board of Governors of the American College of Surgeons.

DEATHS

Dr. Charles C. Nail, Moore, aged 76, died September 26 of bronchopneumonia.

SOUTH CAROLINA

The South Carolina X-Ray Society held its annual meeting in Charleston November 5.

Dr. John M. van de Erve and Miss Caroline Anderson, both of Charleston, were married October 24.

DEATHS

Dr. Milton Cecil Block, Darlington, aged 33, died October 4.

Dr. D. J. Barton, Anderson, aged 55, died recently.

TENNESSEE

Dr. Seale Harris, Jr., formerly of Nashville, has moved to Birmingham, Alabama, where he is associated with Dr. Seale Harris, Sr.

Dr. Harry W. Hollingsworth, formerly of Anthras, has moved to Devonia.

DEATHS

Dr. W. F. Fuson, Liberty, aged 76, died September 10.

Dr. Robert Bruce Layman, Knoxville, aged 64, died September 26.

Dr. W. J. Hammond, Tellico Plains, aged 78, died September 10 of carcinoma of the prostate and myocarditis.

Dr. David A. Swift, Butler, aged 59, died September 20 of cerebral hemorrhage.

Dr. E. L. Gleaves, Nashville, aged 70, died November 1.

TEXAS

The Postgraduate Medical Assembly of South Texas held its annual meeting in Houston, December 2-4.

Dr. Ella M. George has been made Assistant Director of the Health Department of the Dallas Public Schools.

Dr. W. H. Hardy, Jasper, has been made President of the Jasper State Bank.

Dr. A. E. Hill, Dallas, has been put in charge of the Tyler-Smith County Health Unit.

Dr. L. T. Cox, El Paso, has been made Director of the Winkler County Health Unit.

Dr. Alwin M. Clarkson, Dallas, was recently made Epidemiologist to the State Department of Health, succeeding Dr. Charles D. Reece, resigned.

Continued on page 36

YOU WOULDN'T
PRESCRIBE MA HUANG
FOR THE PATIENT
NEEDING EPHEDRINE

ACCEPTED AMERICAN MEDICAL ASS'N

The trend of modern medicine is to prescribe active principles in concentrated and agreeable forms.

In line with this trend, White's Cod Liver Oil Concentrate affords you the active principle of cod liver oil—the natural vitamin "A" and "D" potency fractioned from the natural oil of gadus liver; not a synthetic, not a substitute, but the therapeutic potency of cod liver oil, minus the inert and objectionable fatty bulk.

This natural, concentrated product, 100 times the potency of cod liver oil* is available for clinical use in three convenient, economical dosage forms to suit every type of patient.

For Infants—Liquid Concentrate—two drops of this concentrate equal one teaspoonful of cod liver oil*.

For Youngsters and Adults—Tablets—each candy-like tablet equals one teaspoonful of cod liver oil*.

For Reinforced Dosage—Capsules—each clear, soluble capsule equals four and one-half teaspoonfuls of cod liver oil*.

Recognition of the marked advantages of this concentrate form of medication is attested by the rapidly increasing demand for the three dosage forms of White's Cod Liver Oil Concentrate. It is promoted ethically, and is not advertised to the public.

*U.S.P. Minimum Standard.

White's Cod Liver Oil Concentrate

LIQUID TABLETS CAPSULES
EACH DROP EQUALS ½ TEASPOONFUL
EACH TABLET EQUALS 1 TEASPOONFUL
EACH CAPSULE EQUALS 4½ TEASPOONFULS

WHITE LABORATORIES, Incorporated
113 NORTH 13TH STREET NEWARK, N. J.

V-M Cereal

The First Precooked Cereal With TASTE Appeal!

A delicious product, easily assimilated, rich in vitamins, minerals and milk protein. Especially relished by preschool children, V-M cereal delights older children and adults as well. Notably contributes to improvement of appetite, gain in weight, relief of constipation, where it exists, and to normal growth and development.

Samples on Request

TROFOSE

The Liquid Vitamin-Mineral Concentrate With Many Uses...

A pleasant-tasting tonic, containing ample amounts of vitamins A, B, D and G and dicalcium phosphate. Trofose is designed to supply in an agreeable, convenient and dependable manner essential accessory food factors. Useful for the prevention and treatment of conditions incident to dietary imbalance—whether they occur in infants, children or adults.

Samples on Request

HUGH TEBAULT & CO., INC.
General Motors Building New York, N. Y.

Continued from page 34

Dr. Austin E. Hill, Dallas, has been made Health Officer of Smith County.

Dr. Lyman T. Cox, El Paso, has been made Health Officer of Winkler County.

Dr. A. C. Scott, Jr., Temple, has been made President of the Temple Chamber of Commerce and Board of Development.

Dr. Van C. Tipton, Georgetown, has been doing postgraduate work in Rochester, Minnesota.

Dr. Stewart Cooper, Abilene, has been doing postgraduate work in the East.

Dr. R. L. Yeager and Dr. R. L. Yeager, Jr., Mineral Wells, have been doing postgraduate work in New York.

Dr. Vance Terrell, Stephenville, has been attending clinics in the East.

Dr. Walter A. Minsch, formerly of Athens, Alabama, has moved to Kerrville.

Dr. William M. Blair has moved from Wharton to North Little Rock, Arkansas.

Dr. A. A. Chapman has moved from Sweetwater to Sanatorium.

Dr. J. K. Donaldson has moved from San Antonio to Little Rock, Arkansas.

Dr. Ella Mary George has moved from Denton to Dallas.

Dr. Clay Gwinn has moved from El Paso to Albuquerque, New Mexico.

Dr. T. A. Hendricks has moved from Kilgore to Shreveport, Louisiana.

Dr. A. E. Hill has moved from Dallas to Tyler.

Dr. Frank C. Hodges has moved from Abilene to Memphis, Tennessee.

Dr. Jo W. Howze has moved from Pampa to Corpus Christi.

Dr. John D. Hunt has moved from Forsan to Aquilla.

Dr. W. L. Kitchens has moved from Texarkana to Apple Springs.

Dr. Truman N. Morris has moved from Austin to Brooklyn, New York.

Dr. Charles D. Reece has moved from Austin to Houston.

Dr. Sterling E. Russ has moved from San Antonio to Alice.

Dr. Lewis K. Sweet has moved from San Antonio to Talequah, Oklahoma.

Dr. A. W. West has moved from Wichita Falls to San Antonio.

Dr. David L. White has moved from Austin to San Marcos.

Dr. A. W. Thompson, O'Donnell, and Mrs. Lula Campbell were married September 26.

Dr. Richard Osler Price, Kilgore, and Miss Mae Jouflas were married recently.

Dr. Jesse Polk Lockhart and Miss Margaret Caldwell, both of Pharr, were married September 10.

Dr. William T. Shell, Jr., Corsicana, and Miss Emma Jean Lock were married October 14.

Deaths

Dr. Royal Stuart Adams, San Antonio, aged 46, died September 21 of cerebral hemorrhage, chronic nephritis and arteriosclerosis.

Dr. Hester Brewer Smith, Dallas, aged 46, died September 1.

Dr. Ernest E. Palmer, Kerrville, aged 80, died October 14 of injuries received in an automobile accident.

Dr. Wiley Smith, Van Horn, aged 56, died recently of heart disease.

Dr. Roy Louis Pendergraft, Amarillo, aged 48, died October 1 of acute appendicitis.

Dr. Thomas Eugene Moore, San Antonio, aged 61, died September 20.

Dr. William B. Weeks, Maypearl, aged 71, died September 20 of heart disease.

Dr. J. Bonner Mitchell, Beaumont, aged 58, died October 1.

Continued on page 38

Classified Advertisements

ASSISTANCE OFFERED TO MEDICAL WRITERS. Research. Abstracts. Translations (all languages). Papers prepared from author's data. Ten years' experience with leading physicians and appointments on medical journals of highest standing. I employ no assistants; all my work is done personally and is reliable. Florence Annan Carpenter, 1801 Sixteenth St., N. W., Washington, D. C.

LONG AWAITED DISCOVERY!

True Chemotherapeutic Agent for STREPTOCOCCUS INFECTIONS

Striking results **have been obtained by the use of Prontosil in numerous severe cases of puerperal fever and in peritonitis. Even in some cases of peritonitis with streptococcic septicemia distinct improvement has occurred within forty-eight hours after beginning of treatment. Prompt subsidence of fever and signs of infection has been observed with surprising frequency in other types of streptococcus infection.**

INDICATIONS. Prontosil is especially indicated in *Streptococcus haemolyticus infections*, including *puerperal* and *postabortal septicemia; peritonitis associated with ruptured appendix, perforated peptic ulcer or gallbladder;* also in *traumatic or postoperative wounds, suppurative mastoiditis, phlegmonous tonsillitis,* and in *erysipelas and scarlet fever.*

HOW SUPPLIED: Prontosil Sterile Solution (2.5 per cent) in ampules of 5 cc. and 10 cc., boxes of 5, for intramuscular injection.

For supplementary treatment by oral administration, Prontylin (trademark, *p*-aminophenylsulphonamide), in 5 grain tablets, bottles of 25.

PRONTOSIL

Trademark

SOLUTION IN AMPULES

Disodium 4-sulphamido-phenyl-2-azo-7-acetylamino-1-hydroxynaphthalene 3,6-disulphonate

Write for pamphlet containing detailed information concerning action, manner of use and dosage, as well as references to published reports.

WINTHROP CHEMICAL COMPANY, INC.

Pharmaceuticals of merit for the physician

NEW YORK, N. Y. WINDSOR, ONT.

Factories: Rensselaer, N. Y. Windsor, Ont.

508M

Continued from page 36

Dr. John Caldwell Foster, Clarksville, aged 93, died September 23 of cerebral hemorrhage.

Dr. Nathaniel Norris Allen, Houston, aged 62, died September 22 of coronary thrombosis.

VIRGINIA

The American Clinical and Climatological Association held its annual meeting in Richmond October 26-28.

The Medical Association of the Valley of Virginia has elected the following officers for the coming year: Dr. R. P. Hawkins, Clifton Forge, President; Dr. Frank Leech, Lexington, and Dr. Frederick Gochnauer, Upperville, Vice-Presidents; Dr. Alex F. Robertson, Jr., Staunton, Secretary; Dr. H. G. Middlekauff, Weyers Cave, Treasurer.

The Petersburg Medical Faculty has elected the following officers for the coming year: Dr. W. Allen Barker, President; Dr. Mason Roomaine and Dr. Leta J. White, Vice-Presidents; Dr. Wilbur M. Bowman, Secretary.

The Hanover County Medical Society has elected the following officers for the coming year: Dr. J. T. Vaughan, Ashland, President; Dr. Hawes Campbell, Jr., Hanover, Vice-President; Dr. Eldridge Stanley, Beaverdam, Secretary-Treasurer.

The Southwestern Virginia Medical Society has elected the following officers for the coming year: Dr. John J. Geisen, Radford, President; Dr. P. S. Smith, Abingdon, Vice-President; Dr. H. W. Bachman, Bristol, Secretary-Treasurer.

Dr. Wayne M. Phipps, Hopewell, has been made a member of the Board of Directors of the Hopewell Kiwanis Club.

Dr. E. N. Lillard, Madison, has been made Mayor of that city.

Dr. Paul Kimmelstiel and Dr. J. H. Scherer, Richmond, have been named joint coroners for that city, succeeding the late Dr. James Whitfield.

Dr. Harold W. Miller, Woodstock, has been named coroner of Shenandoah County to succeed Dr. William C. Ford, resigned.

Dr. Malcolm H. Harris and Dr. W. S. Cox have been chosen as two of the Directors of the Kiwanis Club of West Point.

Dr. D. L. Anderson, formerly of Catawba Sanatorium, has moved to Sanatorium, Mississippi.

Dr. M. D. Foster, formerly of Elkton, has moved to Stanardsville.

Dr. H. Ward Randolph, Richmond, has moved to Cary Street Road.

Dr. Porter Paisley Vinson, Richmond, has opened offices in the Medical Arts Building.

Dr. John Hamilton Scherer, Richmond, has opened offices and laboratories in the Memorial Hospital.

Dr. Clarry Clyde Trice, Richmond, and Miss Mary Alice Farrell were married October 3.

Dr. Claiborne Barksdale White, Halifax, and Miss Jean Prindle Hardy were married October 31.

Dr. Joseph M. Hitch, University, and Miss Helen F. Goss were married November 7.

Dr. Aquilla Richard Johnston, Richmond, and Miss Catherine Deitrick were married October 24.

Dr. William Perry Moore, Jr., and Miss Mary Elfreth Eggleston, both of Norfolk, were married November 14.

Dr. Richard Sterling Herring, Richmond, and Miss Marie Hurd were married September 2.

Deaths

Dr. John Robin Blair, Richmond, aged 53, died November 1.

Dr. Edward S. Lester, Danville, aged 62, died November 14.

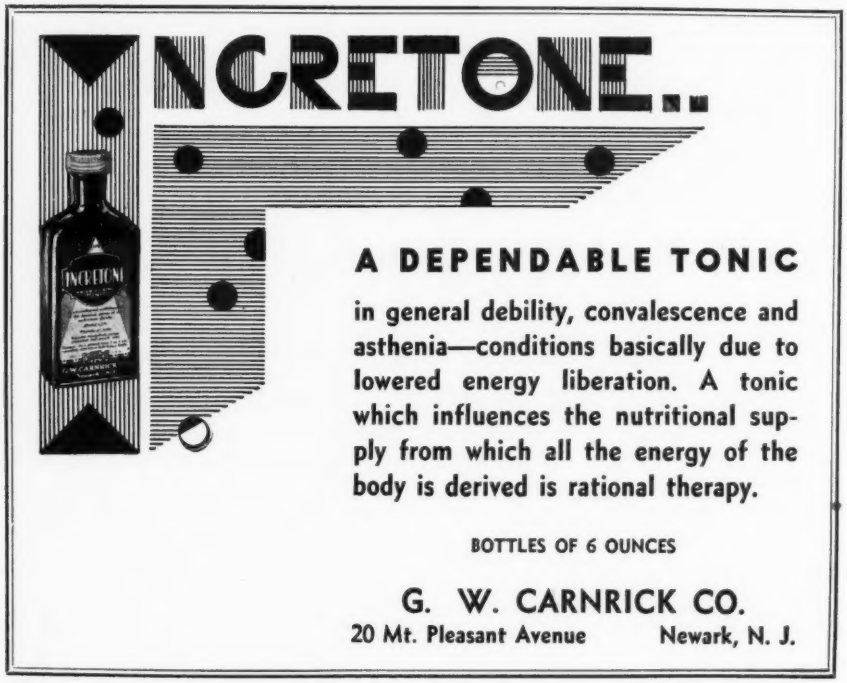
WEST VIRGINIA

The Central West Virginia Medical Society has elected the following officers for the coming year: Dr. L. O. Hill, Camden-on-Gauley, President; Dr. Everett Walker, Adrian, Vice-President; Dr. A. B. Bowyer, Buckhannon, Secretary-Treasurer.

Dr. Rowland Hill Edwards, Welch, and Miss Margaret Hess Hay were married October 15.

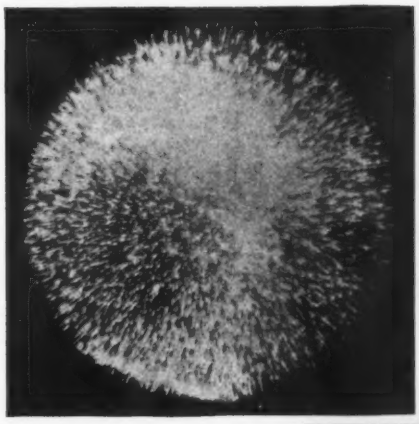
Deaths

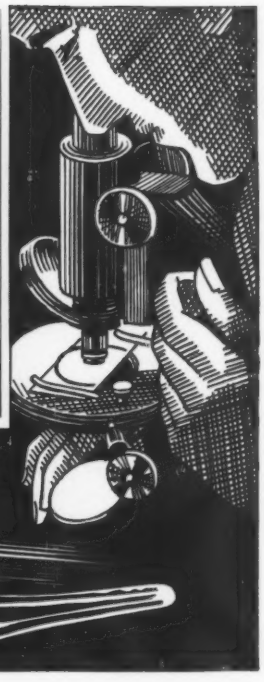
Dr. I. B. Johnson, Bayard, aged 64, died October 15.


INCRETONE
A DEPENDABLE TONIC
in general debility, convalescence and asthenia—conditions basically due to lowered energy liberation. A tonic which influences the nutritional supply from which all the energy of the body is derived is rational therapy.
BOTTLES OF 6 OUNCES
G. W. CARNRICK CO.
20 Mt. Pleasant Avenue Newark, N. J.

When is a colloidal sulfur TRULY COLLOIDAL?

Brownian movement under ultra-microscope proves colloidality of Sulisocol





SULISOCOL

COLLOIDAL SULFUR ISOTONIC

Trade Mark Reg. U. S. Pat. Off. U. S. Pat. No. 1,980,236

Since colloidality is essential to the effectiveness of a colloidal sulfur, it is important that it not only be finely dispersed but also when exhibited under the ultra microscope, it should demonstrate active Brownian-Zsigmondy movement.

Sulisocol, colloidal sulfur isotonic, exerts a beneficent influence on the severest cases of chronic arthritis due to sulfur deficiency. In conjunction with heat therapy, hot baths, diathermy, salicylates, iodides, or any other measures that may be indicated, Sulisocol forms an excellent means of supplementary treatment.

Sulisocol is a detoxicating agent stimulating general metabolic activity and defense. Being isotonic, it has osmotic pressure equivalent to that of the blood with which it is readily miscible, and thus produces no untoward reactions. Sulisocol is nontoxic, non-irritating and practically painless, and may be used safely intravenously or intramuscularly.

A course of 25 Hyposols, two injections weekly, of the 2cc 20 Mgm. size is suggested.

Prepared in Hyposols (ampuls)

1cc 10 Mgm., 25 - $5.50. 2cc 20 Mgm., 25 - $8.50
3cc 30 Mgm., 25 - $10.00

Order through your druggist or supply house. If direct, cash with order.

The Drug Products Co., Inc.

26-41 Skillman Avenue

Long Island City, New York

What is SULISOCOL?

Sulisocol is the original American Injectable Colloidal Sulfur in Sterile Aqueous Clear Isotonic Solution with Characteristic Color of Sulfur. It is the only injectable colloidal sulfur for which U. S. and Foreign Patents have been granted—proof of its originality.

The Drug Products Co., Inc. SM16
26-41 Skillman Avenue,
Long Island City, New York.

Gentlemen: Please send me your revised edition of "Colloidal Sulphur in Chronic Arthritis" and abstract of recent article on Sulisocol.

Dr.....

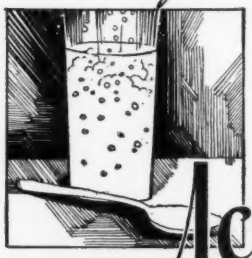
Address.....

City and State.....

The 17th CENTURY

was probably the heyday of blood-letting for the relief of head and other pains, for fevers, for almost any ailment. Inexperienced barbers were allowed to cup and cut sufferers many times a day. Death from venesection was frequent.

The 20th CENTURY



finds the relief of headache and other pain simple in most cases. The march of medical science has replaced barbarous "cures" with clinically tried, efficient analgesics.

Acetanilid

is, in the opinion of many physicians, the foremost of today's analgesics. Years of trial has demonstrated its ability to quell pain promptly and safely, without habit-formation.

Acetanilid has been combined with its synergists, caffeine and bromide, for maximum control of pain with a minimum dosage. This scientifically proportioned pharmaceutical is available in zesty, effervescent form, with citrates, for beneficial alkalinization of blood and plasma.

A generous sample and literature await your request.

EMERSON DRUG COMPANY
BALTIMORE . . . . . MARYLAND

ACIDOSIS

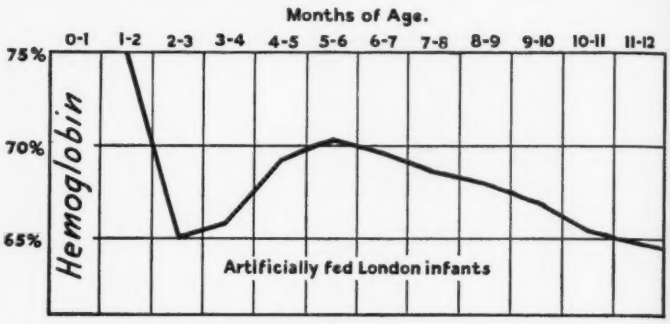
—IT NEED NOT BE

Acidosis is a frequent complication of febrile disease and of metabolic disorders. It tends to aggravate the disease, it probably prolongs it, eases the way to complications and sequelae, and retards convalescence. The untoward influences of acidosis can be curbed by supporting the alkali reserve with Alka-Zane. Alka-Zane supplies the four principal bases of which the reserve is composed: sodium, potassium, calcium and magnesium. The carbonates, citrates and phosphates of these elements are combined in a pleasant-tasting, effervescent salt that makes a zestful, refreshing drink in water. Alka-Zane is supplied in bottles of 1½, 4 and 8 ounces. Trial supply gladly sent on request. William R. Warner & Co., Inc., 113 West 18th Street, New York City.

ALKA ZANE

Nutritional Anemia in Infants

The accompanying chart of the hemoglobin level in the blood of infants is based on more than 1,000 clinical cases studied by Mackay. The sharp drop in hemoglobin during the early months of life has also been reported by a number of other authorities. It is noteworthy that this fall in hemoglobin has been found to parallel closely that of diminishing iron reserve in the infant's liver. The usual milk formula of infants in early life further contributes to this anemia because milk is notably low in iron. It is now possible, however, to increase significantly the iron intake of bottle-fed infants from birth by feeding Dextri-Maltose With Vitamin B in the milk formula. After the third month Pablum as the first solid food offers substantial amounts of iron for both breast- and bottle-fed babies.



Reasons for Early Pablum Feedings

1. The iron stored in the infant's liver at birth is rapidly depleted during the first months of life. (Mackay,[1] Elvehjem.[2])

2. During this period the infant's diet contains very little iron—1.44 mg. per day from the average bottle formulae of 20 ounces, or possibly 1.7 mg. per day from 28 ounces of breast milk. (Holt.[3])

For these reasons, and also because of the low hemoglobin values so frequent among pregnant and nursing mothers (Coons,[4] Galloway[5]), the pediatric trend is constantly toward the addition of iron-containing foods at an earlier age, as early as the third or fourth month. (Blatt,[6] Glazier,[7] Lynch[8].)

The Choice of the Iron-Containing Food

1. Many foods reputed to be high in iron actually add very few milligrams to the diet because much of the iron is lost in cooking or because the amount fed is necessarily small or because the food has a high percentage of water. Strained spinach, for instance, contains only 1 to 1.4 mg. of iron per 100 gm. (Bridges.[9])

2. To be effective, food iron should be in soluble form. Some foods fairly high in total iron are low in soluble iron. (Summerfeldt.[10])

3. **Pablum is high both in total iron (30 mg. per 100 gm.) and soluble iron (7.8 mg. per 100 gm.) and can be fed in significant amounts without digestive upsets as early as the third month, before the initial store of iron in the liver is depleted. Pablum also forms an iron-valuable addition to the diet of pregnant and nursing mothers.**

Pablum (Mead's Cereal thoroughly cooked and dried) consists of wheatmeal, oatmeal, cornmeal, wheat embryo, brewers' yeast, alfalfa leaf, beef bone, iron salt and sodium chloride.

1-10 Bibliography on request.

MEAD JOHNSON & COMPANY, Evansville, Indiana, U. S. A.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons

Old Way...

CURING RICKETS in the CLEFT of an ASH TREE

FOR many centuries,—and apparently down to the present time, even in this country—ricketic children have been passed through a cleft ash tree to cure them of their rickets, and thenceforth a sympathetic relationship was supposed to exist between them and the tree.

Frazer* states that the ordinary mode of effecting the cure is to split a young ash sapling longitudinally for a few feet and pass the child, naked, either three times or three times three through the fissure at sunrise. In the West of England, it is said the passage must be "against the sun." As soon as the ceremony is performed, the tree is bound tightly up and the fissure plastered over with mud or clay. The belief is that just as the cleft in the tree will be healed, so the child's body will be healed, but that if the rift in the tree remains open, the deformity in the child will remain, too, and if the tree were to die, the death of the child would surely follow.

*Frazer, J. G.: The Golden Bough, vol. 1, New York, Macmillan & Co., 1925

It is ironical that the practice of attempting to cure rickets by holding the child in the cleft of an ash tree was associated with the rising of the sun, the light of which we now know is in itself one of Nature's specifics.

New Way...

Preventing and Curing Rickets *with* OLEUM PERCOMORPHUM

NOWADAYS, the physician has at his command, Mead's Oleum Percomorphum, a natural vitamin D product which actually prevents and cures rickets, when given in proper dosage.

Like other specifics for other diseases, larger dosage may be required for extreme cases. It is safe to say that when used in the indicated dosage, Mead's Oleum Percomorphum is a specific in almost all cases of rickets, regardless of degree and duration. Mead's Oleum Percomorphum because of its high vitamins A and D content is also useful in deficiency conditions such as tetany, osteomalacia and xerophthalmia.

Mead's Oleum Percomorphum is not advertised to the public and is now obtainable at drug stores at a new economical price in 10 c.c. and 50 c.c. bottles and 10-drop capsules.

MEAD JOHNSON & COMPANY, Evansville, Indiana, U. S. A.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons.

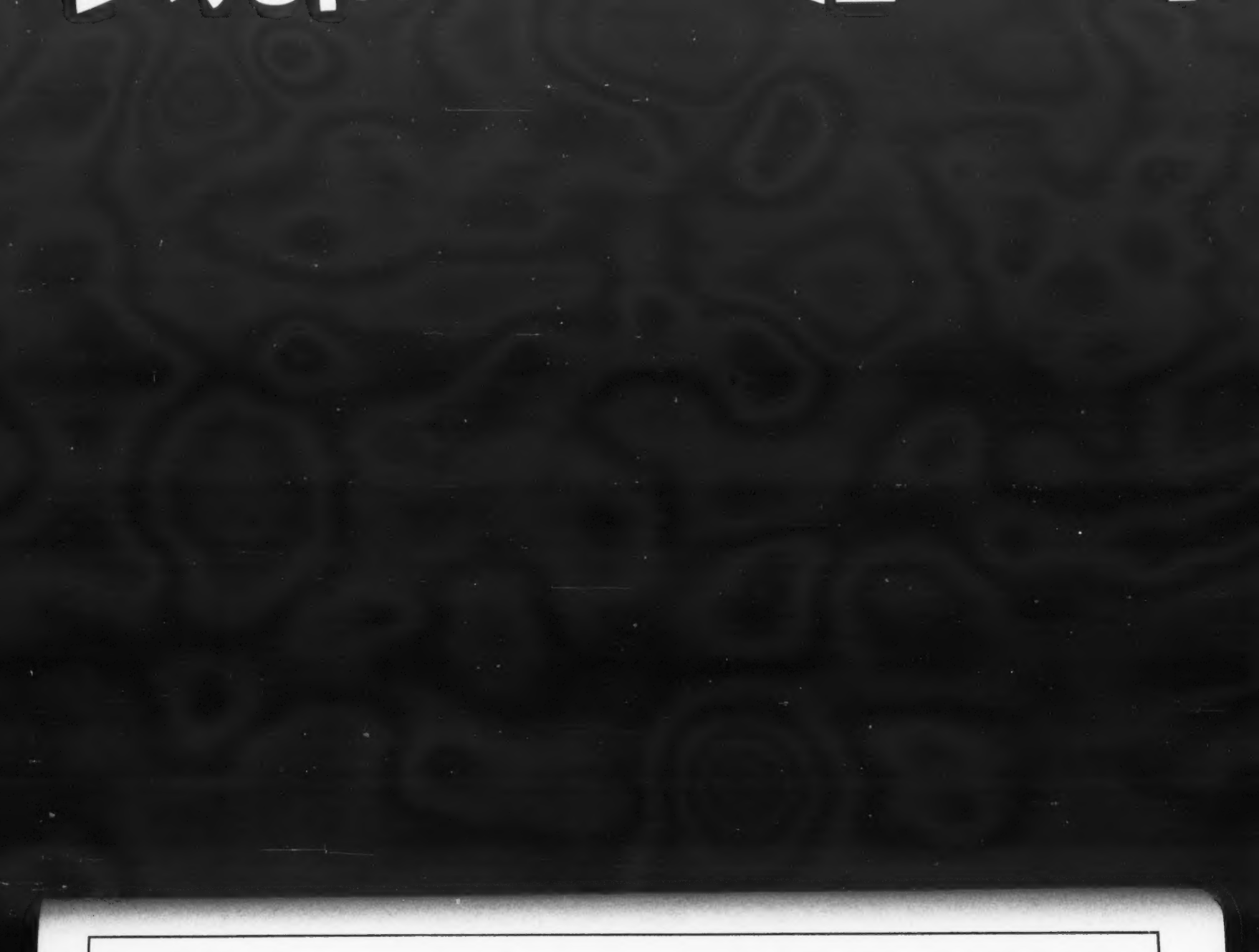
Not the Occasion for Compromise

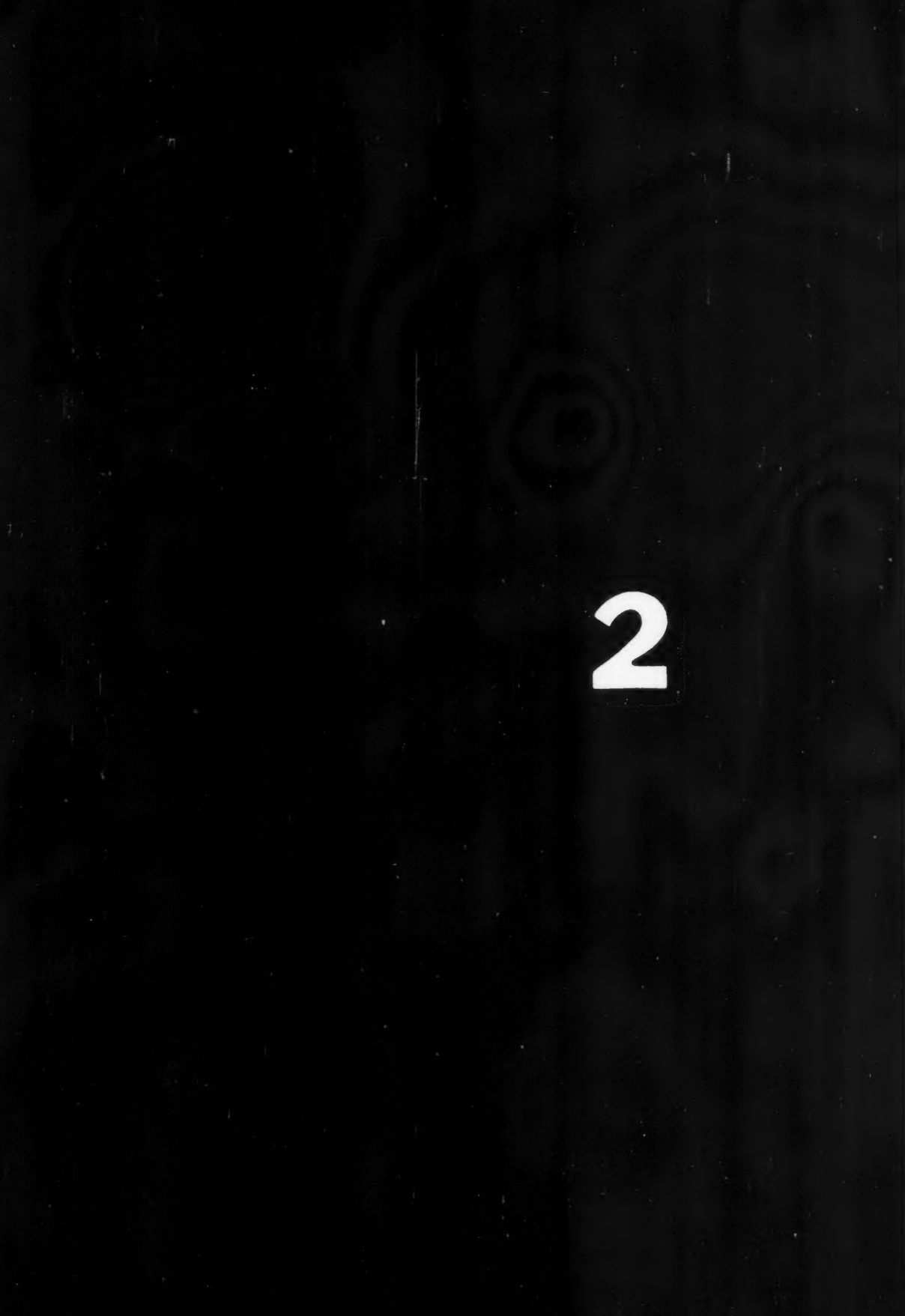
WHEN THE new mother has passed through the first two stages of labor —her strength expended and her physical resources at an ebb—the outcome of her pregnancy must not be compromised. Observing every precaution, the experienced physician chooses his pituitary extract with care.

PITUITRIN, the Parke-Davis solution of posterior pituitary U. S. P. is the *original* commercial pituitary extract. The greater portion of the clinical data reported in the literature has been based on this preparation.

BECAUSE Pituitrin served to introduce pituitary extract to the medical profession, and because of its subsequent wide-spread use, the name is occasionally misapplied to other pituitary products. Be certain that Pituitrin (which is prepared only by Parke, Davis & Company) is supplied on all requisitions. Specify "Pituitrin, P. D. & Co."

PARKE, DAVIS & COMPANY




2

VOLUME 30 FEBRUARY 1937 NUMBER 2

Southern Medical Journal

Journal of the Southern Medical Association

Copyright. Southern Medical Association, 1937. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription, $4.00. Entered as Second-Class Matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

Southern Medical Association, Thirty-First Annual Meeting, New Orleans, Louisiana, November 30-December 1-2-3, 1937

TABLE OF CONTENTS

Cancer of the Ovary. Joe Vincent Meigs, Boston, Massachusetts 133

Discussed by Curtis F. Burnam, Baltimore, Md.

Histogenesis of Some of the More Common Types of Sarcoma. Geo. T. Caldwell, Dallas, Texas 142

The Cultivation of Hemophilus Ducreyi and Preparation of an Antigen for Intracutaneous Diagnosis of Chancroidal Infection. Everett S. Sanderson and Robert B. Greenblatt, Augusta, Georgia 147

Discussed by Frank W. Hachtel, Baltimore, Md.; David T. Smith, Durham, N. C.

Prophylaxis and Treatment in the Control of Syphilis. Joseph Earle Moore, Baltimore, Maryland 149

A Review of Eclampsia at the Medical College of Virginia Hospitals. H. Hudnall Ware, Jr., and Frances E. Noblin, Richmond, Va. 153

Discussed by M. Pierce Rucker, Richmond, Va.; Charles H. Peckman, Baltimore, Md.; S. A. Cosgrove, Jersey City, N. J.

Preoperative Preparation for Children. Charles W. Maxson, Baltimore, Md. 158

Concluded on Next Page

LEVINE ON HEART DISEASE

This is a strictly clinical consideration designed to meet the needs of family physician, cardiologist, and surgeon. In addition to cardiac diseases, it includes a full discussion of heart conditions in other diseases that will be found of particular value. There are 114 pages on clinical electrocardiography. Octavo of 469 pages, illustrated. By Samuel A. Levine, M.D., Assistant Professor of Medicine, Harvard University. Cloth $5.50 net.

Send orders to

New Orleans J. A. MAJORS COMPANY Dallas

TABLE OF CONTENTS—Continued

The Surgical Treatment of Hypertension. Arthur M. Shipley and Thomas B. Aycock, Baltimore, Maryland 160

Suppurative Pericarditis, With a Report of Eight Cases Treated Surgically. I. A. Bigger, Richmond, Virginia 164

Acute Osteomyelitis in Childhood: Diagnosis and Treatment. H. Earle Conwell and John D. Sherrill, Birmingham, Alabama 171

Discussed by Robert W. Johnson, Baltimore, Maryland.

Lesions of the Fundus Oculi of Special Diagnostic Interest. Grady E. Clay and J. Mason Baird, Atlanta, Georgia 177

The Treatment of Myasthenia Gravis. Samuel S. Riven and Morton F. Mason, Nashville, Tennessee 181

Discussed by F. R. Ford, Baltimore, Md.; Raymond S. Crispell, Durham, N. C.; Walter J. Otis, New Orleans, La.; Jas. Greenwood, Jr., Houston, Tex.

Brain Abscess: A Review of Thirty-Two Surgical Cases. Frank H. Mayfield and R. Glen Spurling, Louisville, Kentucky 191

Discussed by Harry Wilkins, Oklahoma City, Okla.; Joseph E. J. King, New York, N. Y.

The Management of Acute Head Injuries. C. C. Coleman, Richmond, Virginia 196

Interstitial Bronchopneumonia in Children. Joseph S. Wall, Washington, District of Columbia 201

Discussed by Eugene R. Whitmore, Washington, D. C.

Clematis Dermatitis. A. H. Lancaster, Knoxville, Tennessee 207

Discussed by H. Ford Anderson, Washington, District of Columbia.

The Management of Chronic Relapsing Amebiasis. Heinz G. Hummel, Little Rock, Arkansas 209

Discussed by Chas. F. Craig, New Orleans, La.

The Problem of Amebiasis as Seen in Oklahoma. Walker Morledge, Oklahoma City, Oklahoma 214

Discussed by William Calvert Chaney, Memphis, Tenn.

Duodenal Diverticula. J. A. Beals, Greenville, Mississippi 218

Discussed by Franklin B. Bogart, Chattanooga, Tenn.; Charles A. Waters, Baltimore, Md.

The Diagnosis and Treatment of Conditions Simulating Sinus Disease. Harry R. Slack, Jr., Baltimore, Maryland 222

Blood Findings and Renal Function Test in Kidney Trauma: An Experimental Study. W. Calhoun Stirling and A. M. Lands, Washington, District of Columbia 225

Discussed by Marcus G. Spingarn, Memphis, Tenn.; R. M. LeComte, Washington, D. C.

Observations on Recent Investigations of the Male Sex Hormones. Maximilian Ehrenstein, University, Virginia 229

Discussed by Carl G. Hartman, Baltimore, Maryland.

EDITORIALS 238

Salicylates and Vitamins
Breathing Machine
Gleanings from Recent Journals
Twenty-Five Years Ago

BOOK REVIEWS 241

SOUTHERN MEDICAL NEWS 242

LIPPINCOTT BOOKS

Magnuson—FRACTURES — Second Edition

This new practical book is written to meet the needs of the man who first sees the fracture, not compiled from the works of other men. The whole object is to give information which will make simpler and easier the treatment of fractures and improve the end result.

All methods described in this book have been thoroughly tried and practiced. There are many more which are as good. There may be some that are better but these have worked, and with thought and attention to detail, they will work in the hands of any man, because they are simple and they take into consideration the anatomy and physiology of the parts under treatment, with the mechanical features simplified so that they may be applied without any great amount of special equipment. The illustrations are unique, showing exactly what to do and how to do it.

By Paul B. Magnuson, Associate Professor of Surgery, Northwestern University Medical School, Chicago. Octavo. 499 Pages. 317 Illustrations. Cloth, $5.00.

Barborka—TREATMENT BY DIET — Second Edition

The purpose of this book is: first, to present to physicians a concise, practical and systematic method of prescribing diets and applying treatment by diet to health and disease; second, to aid the physician and dietitian in teaching the individual patient how to make a selection of the proper amount and type of food that has been prescribed for him. The chapter on "The Application of Dietotherapy" offers an excellent method of teaching the patient to visualize definite portions and servings of the various foodstuffs.

By Clifford J. Barborka, M.D., Dept. of Medicine, Northwestern University Medical School, Chicago. Octavo. 615 pages. Illustrated. Cloth, $5.00.

Peham & Amreich—OPERATIVE GYNECOLOGY — New First Edition

For all surgeons and gynecologists. The most beautifully and extensively illustrated work ever offered. Operations are shown step by step (clearly in colors) as they are carried out at the operating table. Indications for operation are discussed, giving the reader the reasons for surgical intervention and the basis of choice for the various operative methods. Finally, the results of the operations are analyzed by a statistical study of the author's own records.

By Dr. H. v. Peham, Prof. of Obstetrics, University of Vienna, Dr. J. Amreich, Privatdozeht for Obstetrics and Gynecology, University of Vienna; Authorized translation by L. Kraeer Ferguson, M.D., Associate in Surgery, University of Pennsylvania. Atlas size. 779 pages. 467 illustrations, mostly in color. Two volumes. Cloth, $25.00.

Imperatori & Burman—NOSE AND THROAT — New First Edition

The arrangement of the material is somewhat different from that of the orthodox textbook. Symptoms, diagnosis and treatment are considered first. The pathology and causation of the diseases under consideration are placed at the end of each discussion. The text is complete, but it has been placed in outline form to make the book as a reference easier.

By Charles J. Imperatori, M.D., F.A.C.S., Professor of Clinical Otolaryngology, New York Post-Graduate Medical School, New York, and Herman J. Burman, M.D., Instructor of Clinical Otolaryngology, New York Post-Graduate Medical School. Octavo. 723 pages. 480 illustrations. Cloth, $7.00.

J. B. LIPPINCOTT COMPANY

LONDON *Since 1875* 16 John St., Adelphi — PHILADELPHIA *Since 1792* East Washington Square — MONTREAL *Since 1879* Confederation Bldg.

KEEP ABREAST in 1937 WITH MOSBY BOOKS

JUST RELEASED

Titus—THE MANAGEMENT OF OBSTETRIC DIFFICULTIES

By PAUL TITUS, Obstetrician and Gynecologist to St. Margaret Memorial Hospital, Pittsburgh.
870 Pages, 314 Illustrations. Price, $8.50

A practical aid to physicians who are meeting and contending with obstetric difficulties and emergencies. Provides swiftly available information to supplement one's judgment respecting the proper management of obstetric emergencies. CONDENSED CONTENTS — Sterility. Difficulties in Diagnosis of Pregnancy. Complications of Pregnancy. Complications of Labor. Obstetric Operations. Complications of the Puerperium. The New-Born Infant. General Care of Patients.

Hollender—PHYSICAL THERAPEUTIC METHODS IN OTOLARYNGOLOGY

By ABRAHAM R. HOLLENDER, M.D., F.A.C.S., Associate in Laryngology, Rhinology and Otology, University of Illinois College of Medicine.

400 Pages, 189 Illustrations. Price, $5.00

Comprehensive in scope—and especially detailed in technic, this work should prove of inestimable value to the otolaryngologist. The general practitioner and the technician should also find this book of material help in treating ear, nose, and throat conditions with physical measures. The basic chapters dealing with photothermy, low voltage, currents, phototherapy, long and short wave diathermy, x-rays and radium are up to the minute in information, highly authoritative and concisely written especially for the otolaryngologist.

Hirschman—SYNOPSIS OF ANORECTAL DISEASES

By LOUIS J. HIRSCHMAN, M.D., F.A.C.S., Professor of Proctology, Medical Department, Wayne University.
288 Pages, 174 Illustrations. Price, $3.50

This work goes into detail especially in the technic of methods of diagnosis and details of treatment which can be administered without the use of general anesthesia. Many methods of office treatment are described and clearly illustrated. Care has been taken to present methods of treatment which do not require complicated or expensive electrical or other apparatus. It does not attempt to treat of the major diseases of the rectum or of the colon but is designedly limited to the treatment of the commoner diseases of the anus, anal canal and the rectum. The diagnosis, however, of major conditions such as carcinoma are included of necessity in order to avoid pitfalls for the unwary.

New and Dependable

Meakins—THE PRACTICE OF MEDICINE

By JONATHAN CAMPBELL MEAKINS, M.D., LL.D., Professor of Medicine and Director of the Department of Medicine, McGill University; Physician-in-Chief, Royal Victoria Hospital, Montreal.

1350 Pages, 505 Illustrations. Price, $10.00

This Practice of Medicine approaches the subject from a physiological and biochemical standpoint rather than from a pathologic anatomical one. The latter, however, is not neglected. The general and local importance of symptoms in leading to the diagnosis and interpretation of disease processes is stressed and each chapter has an introduction which leads up to this. Thus, the general handling of the subject matter is to emphasize that disease can be scientifically analyzed during life and at the bedside.

It is not only a descriptive account of individual diseases but also an attempt so far as our present knowledge goes to be a practical treatise on disease processes in general and how these may be corrected along rational lines. Treatment is also handled along rational lines and the reasons explained as far as possible. The book is profusely illustrated, there being 505 illustrations including 31 color plates. Although designed primarily for the general practitioner the specialist will find much to appeal to him in this work.

Hansel—ALLERGY OF THE NOSE AND PARANASAL SINUSES

By FRENCH K. HANSEL, M.D., M.S., Assistant Professor of Clinical Otolaryngology, Washington University School of Medicine, St. Louis, Mo.
820 Pages, 58 Illustrations, 3 Color Plates. Price, $10.00.

From the standpoint of diagnosis the nasal form of allergy occupies the key position. The book, therefore, is just as important and valuable to the internist and pediatrician as it is to the eye, ear, nose and throat man. It deals not only with the allergic phases of nasal and paranasal sinus diseases, but also with the various factors concerned in sinuses infection.

Murray—EXAMINATION OF THE PATIENT AND SYMPTOMATIC DIAGNOSIS

By J. W. MURRAY, M.D.,
1224 Pages, 274 Illustrations. Price, $10.00.

Covers fully every phase of history taking including the analysis for differential diagnosis of hundreds of symptoms. Tells the doctor exactly what to look for and how to interpret the findings. If the technic here prescribed is rigidly and systematically pursued it will yield results in a form that will be of the greatest practical value to the examiner.

Sadler—THEORY AND PRACTICE OF PSYCHIATRY

By WILLIAM S. SADLER, M.D., Chief Psychiatrist and Director, the Chicago Institute of Research and Diagnosis.

1231 Pages. Price, $10.00

For many years there has existed a need for a practical psychiatry—a book setting forth the symptoms, signs, diagnosis, differential diagnosis, prognosis and treatment of disorders of the mind. Sadler's book fills this need. This book deals with pre-institutional psychoses, cases met in general medical practice and in the mental hygiene clinics as well as by the psychiatrist. It brings together a treatise not too technical in its presentation which covers the whole field of psychopathology and mental hygiene. Its pages reflect the modern viewpoint of psychiatry. The Journal of Southern Medicine and Surgery says this about Sadler: "It may well be doubted if there is to be found between the lids of any other book so much instruction of everyday usefulness to the doctor of medicine."

Taussig—ABORTION: Spontaneous and Induced

By FREDERICK J. TAUSSIG, M.D., F.A.C.S., Professor of Clinical Obstetrics and Clinical Gynecology, Washington University School of Medicine, St. Louis, Mo.

525 Pages, 146 Illustrations. Price, $7.50.

The needless wreckage of human lives that comes as a result of abortion is a problem of the first magnitude for the medical practitioner. This book is the first complete discussion in any language of all medical aspects of abortion. Diagnosis, prevention and treatment are analyzed in simple, clear summaries for the benefit of the practitioner.

THE C. V. MOSBY COMPANY, SMJ-2-37
3525 Pine Blvd., St. Louis, Mo.

Gentlemen: Send me the following items.....

.....

.....

....., charging my account.

Dr.....

Address.....

Announcing

OPERATIVE SURGERY

IN TWO VOLUMES

By J. SHELTON HORSLEY, M.D., LL.D., F.A.C.S.

Attending Surgeon, St. Elizabeth's Hospital, Richmond, Va.

And

ISAAC A. BIGGER, M.D.,

Professor of Surgery, Medical College of Virginia, Surgeon-in-Chief, Medical College of Virginia Hospitals, Richmond, Va.

With Contributions by C. C. COLEMAN, M.D., F.A.C.S., Professor of Neurological Surgery, Medical College of Virginia; AUSTIN I. DODSON, M.D., F.A.C.S., Professor of Urology, Medical College of Virginia; JOHN S. HORSLEY, JR., M.D., Assistant Professor of Surgery, Medical College of Virginia; and DONALD M. FAULKNER, M.D., Associate Orthopedist, Medical College of Virginia.

1450 Pages.....1300 Illustrations.

Price, $15.00

"Operative Surgery" needs no introduction, having already gone through three editions, but this new and greatly enlarged Fourth Edition, appearing for the first time in two volumes, will more than please you. Arranged in orderly fashion, profusely illustrated, complete in its coverage, this new work by Horsley and Bigger will bring your surgical literature up to date.

The new Fourth Edition follows the same general lines as the other editions. The methods described are those which either have been actually used by the author who writes of them or which seem to him to be the best for the lesion under consideration. Efforts have been made to base operative procedures upon physiologic function whenever consistent with the main object of the operation.

The technical steps of all the operations are always described and the indications for the operation, and frequently the underlying anatomical considerations and physiologic principles that are involved, are discussed. In operations on the neck a resume of the anatomy is given. The anatomy and physiology of the chest are described in some detail as a preliminary in the section on thoracic surgery. The physiologic reasons for surgical operations upon the stomach and intestines are emphasized. The conditions that demand operation in fractures of the skull are fully discussed, as well as the technic of performing these operations.

Many new operative procedures are described which have not heretofore been published in a book, but none has been recommended which does not seem sound. At the same time such chapters as that on surgical drainage and on the underlying principles of the operations for malignant tumors have been retained. There are many new chapters, as the chapter on the surgery of acute abdominal conditions, and much of the work in the special fields has not heretofore appeared in any book.

Only $3.00 A Month!

For only $3.00 a month you can have this brand new two-volume work on Operative Surgery by Horsley and Bigger placed in your library. Use the coupon at the right in placing your order now and get the help and guidance of this unusually complete work.

Use This Coupon in Ordering

THE C. V. MOSBY COMPANY, SMJ-2-37
3525 Pine Blvd., St. Louis, Mo.

Gentlemen: Send me the New Fourth Edition of Horsley and Bigger "Operative Surgery" in two volumes. Charge my account with $15.00, billing me at the rate of $3.00 per month.

Dr.....

Street.....

City..... State.....

The first formula must agree with the baby!

NEWBORNS require breast milk. Deprived of human milk, their nutritional requirements are met by simple mixtures of cow's milk, sugar and water. The milk may be fresh, evaporated, dried, sweet or sour; the sugar simple or mixed.

Whole milk formulas are suitable for most newborns with good digestive capacities. **The amount of whole milk given should approximate ⅔ of the total required calories. And the remainder (⅓) should be in added Karo.** Water is added to the mixture for the fluid intake to be about 2½ ounces per pound of baby weight per day.

Evaporated milk formulas are indicated for newborns with limited digestive capacities. They may be used to advantage in considerably higher concentrations than whole milk for premature, feeble and debilitated infants. ***The added Karo is again one-third of the total required calories.***

Dried milk formulas are suitable for allergic infants who will take only small volumes at a feeding and for babies of allergic parents. Formulas approximately equivalent to whole milk may be made up with water and **Karo added in the same ratio as in whole milk mixtures.**

Acid milk formulas are of particular value for babies with low digestive capacities requiring large food requirements. Acid milk requires no dilution with water. **The amount of Karo required may be added directly to the total volume of acid milk prescribed.**

Karo is an excellent milk modifier of dextrins, maltose and dextrose (with a small percentage of sucrose added for flavor) for both the baby and the budget.

FORMULAS FOR THE NEWBORN

3 Ounces; 6 Feedings

Whole Milk	10 ounces
Boiled Water	10 ounces
Karo	2 tablespoons
Evaporated Milk	6 ounces
Boiled Water	12 ounces
Karo	2 tablespoons
Powdered Milk	5 tablespoons
Boiled Water	20 ounces
Karo	2 tablespoons
Lactic Acid Milk	12 ounces
Boiled Water	8 ounces
Karo	2 tablespoons

References: Kugelmass, Clinical Nutrition in Infancy and Childhood, Lippincott; Marriott, Infant Nutrition, Mosby; McClean & Fales, Scientific Feeding in Infancy, Lea & Febiger.

For further information, write Dept. S-2
CORN PRODUCTS SALES COMPANY
17 Battery Place, New York, N. Y.

★ **Infant feeding practice is primarily the concern of the physician, therefore, Karo for infant feeding is advertised to the Medical Profession exclusively.**

SEROBACTERINS, Mulford

SEROBACTERINS are sensitized bacterial vaccines—suspensions of killed pathogenic bacteria combined with antibodies from specific immune serum, and standardized by bacterial count.

These antigen-antibody combinations possess all the characteristics of bacterial vaccines plus these additional advantages:

Being sensitized with antibodies from specific immune serum, they offer a degree of immediate protection which eliminates the so-called "negative phase" following injection. Local and systemic reactions are reduced to a minimum. More frequent and larger dosage results in a more rapid immunological response.

Nineteen Serobacterins are supplied in individual and bulk treatment packages for the common clinical conditions in which bacterial vaccine therapy is indicated.

"For the Conservation of Life"

MULFORD BIOLOGICAL LABORATORIES

PHILADELPHIA SHARP & DOHME *BALTIMORE*

THE VALUE OF TRADE PYRIDIUM MARK THERAPY HAS BEEN ESTABLISHED IN

CYSTITIS
PYELITIS
URETHRITIS
PROSTATITIS
VAGINITIS
AND IN
PREOPERATIVE
URINARY TRACT
INFECTIONS

"In the kidney and bladder cases, especially those with pronounced infection, Pyridium promptly allayed the acute symptoms and successfully combatted the concomitant infection, thus reducing the time usually required to effect recovery."

—*Quoted from Published Clinical Reports*

MERCK & CO. INC. *Manufacturing Chemists* RAHWAY, N. J.

"The proteins in woman's milk and in cow's milk differ both in amount and in character. In woman's milk, the proteins consist of lactalbumin and casein in the proportion of two-thirds of the former to one-third of the latter. In cow's milk about one-sixth of the protein is lactalbumin and the remainder casein. The total protein in human milk precipitates in fine flakes, that of cow's milk in heavy curds."

Friedenwald and Ruhrah: "Diet in Health and Disease"

A—Without gelatine, hard, indigestible milk curds.

B—With gelatine, soft, flocculent milk curds.

KNOX SPARKLING GELATINE

Knox Gelatine

Softens Casein Curds in Artificial Feedings

In baby's milk formula, the danger of hard, tough, casein curds may be avoided by the addition of Gelatine (U.S.P.). The colloidal action of a pure gelatine—such as Knox—emulsifies the milk, forming fine, flaky, casein curds.

Only 1% Gelatine U.S.P. added to the daily formula will decrease milk curd tension 50%. It is recommended through research finding that one envelope of Knox Gelatine—which is equivalent to 1 level tablespoonful or ¼ ounce—added to the prescribed daily milk formula will bring desired results of soft, digestible curds.

Knox Gelatine is scientifically made from selected long, hard, shank beef-bones—surpasses minimum U.S.P. requirements—pH about 6.0—contains no carbohydrates—fat content less than 0.1%—odorless—tasteless—bacteriologically safe.

DOCTOR—when prescribing, specify Knox Gelatine to assure U.S.P. quality.

KNOX SPARKLING GELATINE

KNOX GELATINE LABORATORIES,
408 Knox Avenue, Johnstown, N. Y.
Please send me diet prescription pads—also infant feeding literature.

Name .....
Street .....
City ..... State .....

The FIRST SPOONFUL TO THE LAST . . .

Agarol is supplied in 6, 10 and 16 ounce bottles.

Uniformity of composition throughout is important in an emulsion. It assures uniform action from every dose. Agarol is such an emulsion of mineral oil and agar-agar with phenolphthalein. It pours freely as a good emulsion should. It mixes readily with liquids and stays mixed without "cracking."

In the relief of acute constipation and in the treatment of habitual constipation, Agarol affords proved efficiency, consistent reliability, combined with palatability that only purest ingredients can give without artificial flavoring. Let us send you a trial supply. Please ask for it on your letterhead.

AGAROL FOR CONSTIPATION

WILLIAM R. WARNER & COMPANY, INC., 113 West 18th Street, New York City

Pneumonia should be typed!

ANTIPNEUMOCOCCIC RABBIT TYPING SERA

Lederle

CLINICAL ASPECTS do not serve to distinguish the different types of pneumococcus infections.

Not infrequently a striking result in serum therapy has been observed in atypical pneumonia considered not pneumococcal before the type was determined.

The Neufeld method, for immediate pneumococcus typing directly from sputum, represents one of the most important advances in modern serum therapy. It is simple, accurate and permits of a diagnosis being made within a few minutes' time. The method may be employed by any physician once the technique involved is learned, or typing may be done through the aid of a nearby hospital or laboratory. Materials necessary for the test are: a microscope, slide cover slips, and

ANTIPNEUMOCOCCIC RABBIT TYPING SERA ***Lederle*** *containing methylene blue, for Neufeld Reaction Test, ready for immediate use.*

LEDERLE'S PNEUMONIA SERVICE INCLUDES

FOR DIAGNOSIS:

Rabbit Typing Sera, for Neufeld Reaction, for Types I to XXXII, supplied in the following packages:

0.5 cc. vial — 5 capillary tubes

FOR TREATMENT:

Bivalent Types I and II as well as Monovalent Antipneumococcic Serum, supplied in the following packages:

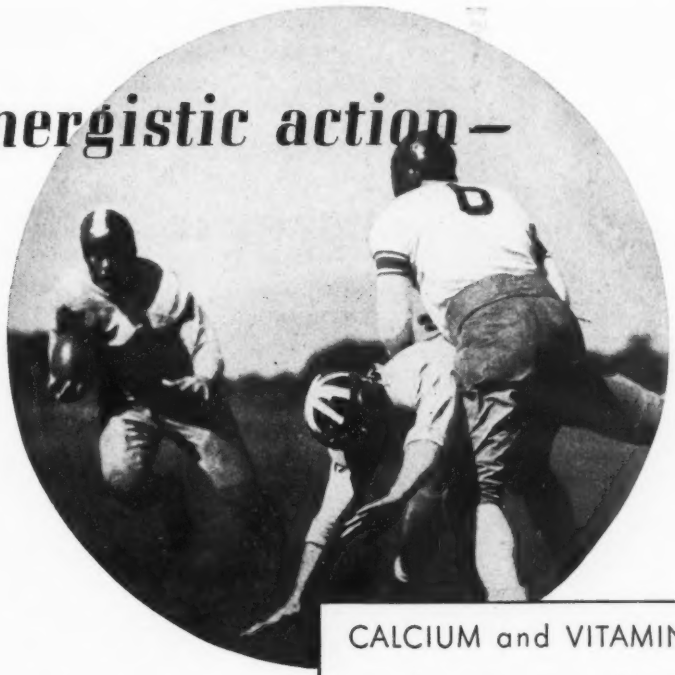
10,000 units in syringe — 20,000 units in syringe

LEDERLE LABORATORIES, INC.
30 ROCKEFELLER PLAZA NEW YORK, N. Y.

for Coughs

THE ALKALIZING COUGH SEDATIVE

Synergistic action—



CALCIUM and VITAMIN C
are the main ingredients of
CAL-C-MALT 'ROCHE'

- *SOUND TEETH*
- *IMPROVED APPETITE*
- *ROBUST HEALTH*

Frequently prescribed in cases in which the vitamin-C reserve needs building up to resist infection. Each dose contains 50 mg. of vitamin C 'Roche, as much of this vitamin as is contained in two average size oranges. Cal-C-Malt, moreover, is an effective nutritive tonic, increasing appetite and facilitating a much-needed gain in weight in run-down patients.

MIX CAL-C-MALT WITH MILK
IT MAKES A DELICIOUS, HEALTHFUL DRINK

In addition to dicalcium phosphate and vitamin C, Cal-C-Malt contains vitamin B (the appetite vitamin) and diastatic malt, all combined in the finest quality chocolate base.

Supplied in 12-oz cans

HOFFMANN-LA ROCHE • INC • NUTLEY • N. J.

Adequate Treatment of Pernicious Anemia

● Of paramount importance in the treatment of pernicious anemia is the administration of adequate antianemic material, such as is contained in liver, to restore hemoglobin and red blood cell levels.

In cases where there is evidence that subacute combined degeneration of the spinal cord is present, therapy must be adequate to arrest completely all progress of the cord degeneration. Adequate doses of solutions of liver extract can be conveniently given by parenteral injection.

For this purpose the following preparations are offered:

Solution Liver Extract Concentrated, Lilly—Supplied in 10-cc. rubber-stoppered ampoules and in packages of four 3-cc. rubber-stoppered ampoules.

Solution Liver Extract, Lilly—Supplied in 10-cc. rubber-stoppered ampoules.

ELI LILLY AND COMPANY

Principal Offices and Laboratories, Indianapolis, Indiana, U. S. A.

THE MENOPAUSE

•

TO MANY WOMEN the menopause is a most critical period, fraught with mental and physical disturbances. Thousands of cases have been alleviated by the use of Amniotin—a Squibb preparation of the estrus-inducing ovarian follicular hormone.

Amniotin is available for hypodermic use in 1-cc. ampuls containing 2000 and 10,000 International units. Also available in the form of Pessaries and Capsules containing 2000 and 1000 International units respectively.

ALSO AVAILABLE: Follutein—The anterior pituitary-like factor from pregnancy urine. Available in 500, 1000 and 5000 rat unit packages. **Anterior Pituitary Extract**—Contains growth, thyrotropic and sex complementary factors. Supplied in 10-cc. vials containing 100 growth units.

For literature giving full information write Professional Service Department, 745 Fifth Avenue, New York City

E·R·SQUIBB & SONS, NEW YORK
MANUFACTURING CHEMISTS TO THE MEDICAL PROFESSION SINCE 1858.

Readily ASSIMILABLE FAT -- an essential in FEEDING THE PREMATURE

IN a recent study of fat metabolism in infants, Holt, Tidwell and Kirk* report that olive oil showed the highest percent retention (95.1%) of all fats studied but one, olein (97.5%). These authors found the fat of SIMILAC (which is 20% olive oil) showed a better percent retention (92.6%) than butter fat (88.9%)—and as high a retention as breast milk fat (92.4%).

To quote these authors—"the differences in fat retention on these various fats as shown on normal infants are not great; for the normal infant it is probably immaterial whether he absorbs 85% or 95% of his fat intake. It seemed possible, however, that *in subjects who have difficulty in fat assimilation, such as premature infants, the observed small differences might become large differences. A few observations made on premature infants and twins have borne this out—.*"

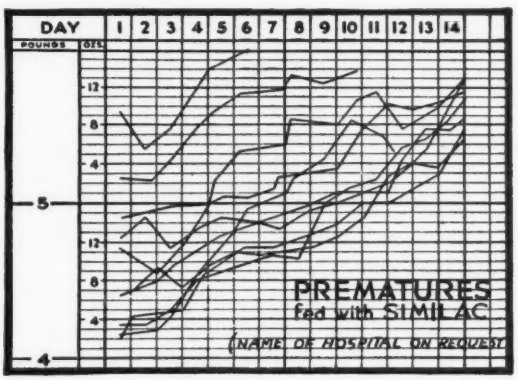
The observations referred to covered only three prematures fed on different fats, but showed an average of 78.4% retention for olive oil as compared to only 52.5% retention for butter fat.

*Holt, Tidwell and Kirk, Studies on Fat Metabolism in Infants—Acta Pediatrica, Vol. XVI, 1933.

SIMILAC

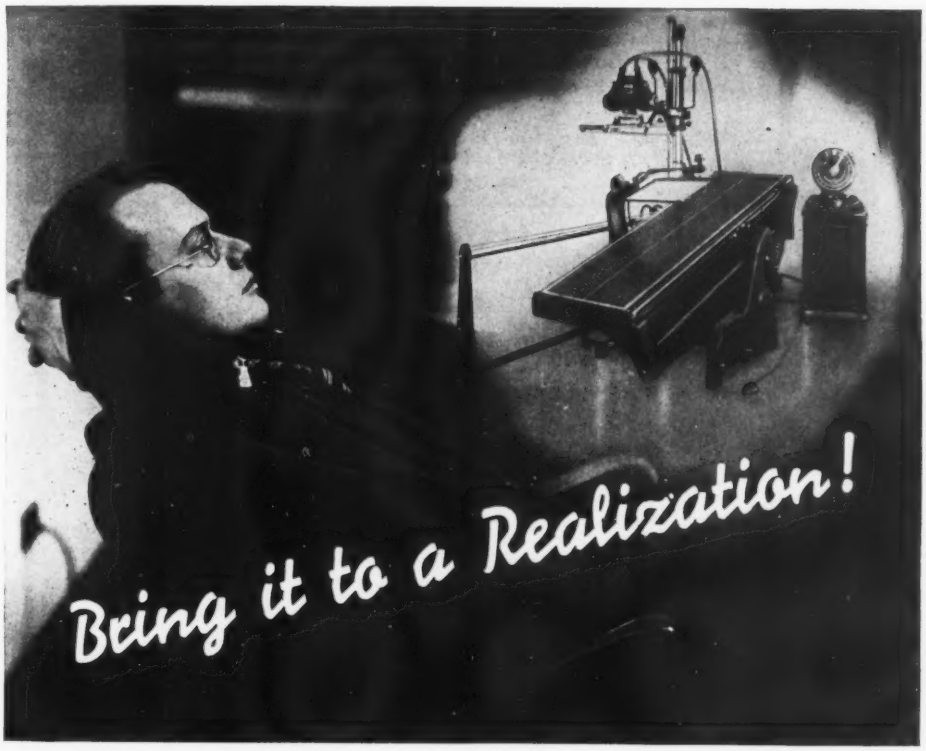
has given noticeably good results in feeding the premature infant. One of the reasons lies, as here pointed out, in the composition of its fat. Another reason is its consistently zero curd tension. The finer the curd the greater the surface area. The greater the surface area the more exposed are the fats, carbohydrates, proteins and salts to the digestive enzymes. Result . . . the food substances are more quickly and readily utilized.

SIMILAC is made from fresh skim milk (casein modified) with added lactose, salts, milk fat, and vegetable and cod liver oils.



The fact that SIMILAC is well assimilated by the immature digestive tract of the premature indicates how entirely suitable it is for all those infants who are deprived of breast milk.

M & R DIETETIC LABORATORIES, Inc., Columbus, Ohio



COMPLETE X-RAY SERVICE IN YOUR OFFICE

New High-Powered G-E X-Ray Unit is a Boon to Modern Practice

NOW it becomes feasible for you to install in your office a major-calibre x-ray unit to produce a uniformly high quality of work that is most gratifying.

The G-E Model R-36 Shockproof X-Ray Unit, though it occupies a very small floor space, equips you for radiography of all parts of the body, including fractional-second exposures. A single x-ray tube—double-focus and oil-immersed—covers this entire radiographic range. For fluoroscopic diagnosis, in all angular positions from 15° Trendelenburg to vertical, a separate oil-immersed and shockproof unit is mounted under the table top.

Here you find the refinement of control essential to radiography of a strictly high order—yet so simplified and accurate that you can always rely on R-36 performance. You need not interpret films of a compromising quality.

Moderately priced, the R-36 represents the greatest value ever offered in complete diagnostic equipment—probably the big opportunity you have long awaited.

Address Dept. A32 for the illustrated catalog, without obligation.

GENERAL ELECTRIC
X-RAY CORPORATION
7012 JACKSON BLVD. CHICAGO, ILLINOIS

GUIDE TO TERMINOLOGY of the FEMALE SEX HORMONES

ESTROGENIC (FOLLICULAR) SUBSTANCES

	Chemical Synonyms	Schering Corporation's Trade Names	Source* (Technical)	Characteristics
1.	Estrone Theelin Estrin Ketohydroxyestrin Oestrin Folliculin		Urine of pregnant women and/or mares.	Excretion form of hormone.
2.	Estradiol Dihydrotheelin Dihydroxyestrin Dihydrofolliculin	**PROGYNON-DH†** Tablets for peroral use	Partly synthetic process starting with estrone obtained from pregnancy urine.	The only hormone isolated from ovarian tissue by Doisy and co-workers. Especially adapted for oral therapy in a measured potency with a strong action.
3.	Benzoic Acid Ester of Estradiol Benzoic Acid Ester of Dihydrotheelin Benzoic Acid Ester of Dihydroxyestrin Benzoic Acid Ester of Dihydrofolliculin	**PROGYNON-B†** Oil solution for intramuscular injection	Partly synthetic process starting with estrone obtained from pregnancy urine.	The benzoate of the above hormone, slowly absorbed, steady in action, slowly eliminated—longer lasting—highly potent.
4.	Estriol Theelol Estratriol Oestriol		Urine of pregnant women and human placenta.	Less active than estrone by Allan-Doisy test.
	LUTEAL HORMONE			
5.	Progesterone Corpus Luteum Hormone Progestine Luteosterone Corporin	**PROLUTON†** Oil solution for intramuscular injection	Synthesized from sterols derived from soy bean oil.	The synthetic crystalline corpus luteum hormone in a solution of oil, essential to the maintenance of pregnancy.

*Sources not of commercial or practical value have been omitted from this chart.

†Trade Mark Reg. U. S. Pat. Off. Copyright 1937, Schering Corporation

SCHERING

The unsettled state of endocrinologic nomenclature has been the cause of much confusion. The above chart is offered as a guide through this maze of terminology. Clip this chart or write us for a copy for your files.

SCHERING CORPORATION, Bloomfield, New Jersey

A PALATABLE COD LIVER OIL EMULSION

AT LOW COST TO THE PATIENT

MALTINE WITH COD LIVER OIL* is also guaranteed to contain vitamins A, B, D and G. In addition, it contains other nutritive factors not found in plain cod liver oil. Laboratory tests on animals indicate that the vitamin A efficacy of cod liver oil is enhanced *twofold* when emulsified in Maltine as in MALTINE WITH COD LIVER OIL. MALTINE WITH COD LIVER OIL and Iron Iodide is also available, containing two grains of freshly prepared iron iodide per fluid ounce.

*Containing Maltine 70%, cod liver oil 30%.

THE MALTINE COMPANY
60 Hudson Street New York, N. Y.

ACCEPTED AMERICAN MEDICAL ASSN

GENUINE

Maltine

Trade-mark Reg. U. S. Pat. Off.

WITH COD LIVER OIL

Esteemed by the medical profession since 1875

Mellin's Food

Milk Modifier

contains

Maltose and Dextrins
Cereal Proteins
Minerals

Feeding Formula

For an Infant 2 months old
Weight 10 pounds

Whole Milk	**16 ounces**
Water	**12 ounces**
Mellin's Food	**6 level tablespoons**

This is a typical example of food mixtures for well infants as suggested on the card, "Formulas for Infant Feeding," arranged for physicians' use.

This mixture provides for an intake of the following food constituents and liquid for each pound of body weight:

2.0 grams of proteins
1.8 grams of fat
5.5 grams of carbohydrates
0.5 grams of minerals
78.0 cubic centimeters of liquid

All suggested mixtures on the feeding card are well calculated to furnish food constituents in proportional amounts to satisfy the nutritive requirements in relation to the age and weight of the individual baby with a supply of liquid to maintain the water balance.

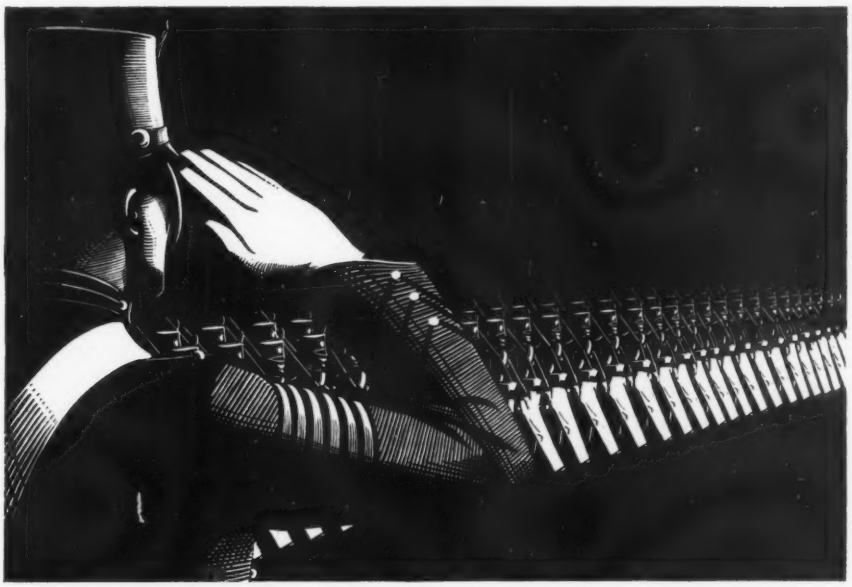
Constipation or other symptoms of intestinal disturbances are not likely to occur from the use of these mixtures and progressive gain may be expected.

Formula Card and samples of Mellin's Food sent to physicians upon request.

Directions for using Mellin's Food are left entirely to the physician.

Mellin's Food Company
Boston, Mass.

MELLIN'S FOOD: Produced by an infusion of Wheat Flour, Wheat Bran and Malted Barley admixed with Potassium Bicarbonate—consisting essentially of Maltose, Dextrins, Proteins and Mineral Salts.



DISCIPLINE

"Discipline is the development of the faculties by instruction and exercise." When functions such as habit time of bowel movement are neglected through lack of discipline or intelligence, they require careful training to restore them to a normal state.

Petrolagar has proved to be an agreeable and effective means of assisting in the establishment of bowel discipline. Because Petrolagar mixes intimately with the bowel contents, it increases the bulk in the stool to a soft mass which is easily passed.

Petrolagar is prepared in five types — providing the doctor with a variation of treatment to suit the individual patient. Petrolagar Laboratories, Inc., Chicago, Ill.

Petrolagar is a mechanical emulsion of pure liquid petrolatum (65% by volume) and agar-agar. Accepted by the Council on Pharmacy and Chemistry of the American Medical Association for the treatment of constipation.

Petrolagar

VALIANT

IS THE WORD FOR CORAMINE

Coramine, "Ciba", always strives bravely to save victims of heart and respiratory failure. A high percentage of success has won wide professional praise for this efficient stimulant. There is a wide range between the effective and the toxic dose of Coramine. Relief is prompt and sustained.

Call for Coramine, "Ciba", when treating accident cases, asphyxiation, poisoning, traumatic or surgical shock, pneumonia crises. You will find it a valiant cardiac and respiratory aid. . . Literature on request.

CIBA COMPANY, INCORPORATED

NEW YORK N. Y.

A

STRIKING ACHIEVEMENT

The synthetic production of vitamin B_1 in pure form represents a distinctive chemical achievement. Vitamin B_1 is recognized as a dietary essential for infants, children and adults.

The first synthetic vitamin B_1—Betaxin—makes available to physicians an adequate and economical supply of this dietary essential and antineuritic factor. According to clinical reports vitamin B_1 is indicated not only in *beriberi*, but also in less severe B_1 avitaminosis characterized by *anorexia, gastric and intestinal atony*. Its use is also suggested in pregnancy and lactation, when metabolism is increased, as in hyperthyroidism and infections, and in various nervous disorders of nutritional origin.

How Supplied: For oral administration tablets of 0.1 mg. and 1 mg., bottles of 50; for intramuscular injection, ampules of 1 cc. (= 1 mg.), boxes of 10. For research laboratories, crystals in vials of 15 mg. and 50 mg.

Each milligram is equivalent to 500 international units.

507 M

BETAXIN

TRADEMARK

First Synthetic Crystalline

VITAMIN B_1

WINTHROP
CHEMICAL COMPANY, INC.

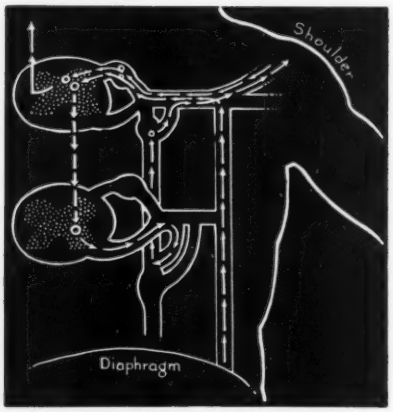
NEW YORK, N. Y. WINDSOR, ONT.

Factories
Rensselaer, N. Y.—Windsor, Ont.

LOCAL ANALGESIA SHOULD TAKE PRECEDENCE OVER GENERAL ANALGESIA

The modus operandi by which a local analgesic relieves pain is explained by a study of the mechanism of referred pain.

Pain may be checked by breaking in on the sensory nerve chain at any point between the place of production and the seat of its appreciation.



Schematic drawing showing the route of referred pain to the shoulder tip that originated in the diaphragmatic pleura.

PANALGESIC

A LIQUID LOCAL ANALGESIC WITH MULTIPLE THERAPEUTIC ACTIONS.

PANALGESIC relieves pain by counterirritation, hyperemia, anesthesia of the terminal nerve endings, and systemic effect of absorbable salicylates.

SUPPLIED IN 2 OUNCE AND ONE-HALF GALLON BOTTLES FOR ETHICAL PRESCRIBING.

Professional Inquiries Solicited

WILLIAM P. POYTHRESS & COMPANY, INC.

MANUFACTURERS OF FINE PHARMACEUTICAL SPECIALTIES - - - RICHMOND, VIRGINIA

THE NEW YORK POLYCLINIC
MEDICAL SCHOOL AND HOSPITAL

(ORGANIZED 1881)

(The Pioneer Post-Graduate Medical Institution in America)

Obstetrics and Gynecology

A full time course. In Obstetrics: Lectures; prenatal clinics; witnessing normal and operative deliveries; operative obstetrics (manikin). In Gynecology: Lectures; touch clinics; witnessing operations; examination of patients pre-operatively: follow-up in wards post-operatively. Obstetrical and Gynecological pathology; regional anesthesia (cadaver). Attendance at conferences in Obstetrics and Gynecology. Operative Gynecology on the Cadaver.

For the General Surgeon

A combined surgical course comprising General Surgery, Traumatic Surgery, Abdominal Surgery, Gastro-Enterology, Proctology, Gynecological Surgery, Urological Surgery, Thoracic Surgery, Pathology, Roentgenology, Physical Therapy, Operative Surgery and Operative Gynecology on the Cadaver.

FOR INFORMATION ADDRESS

MEDICAL EXECUTIVE OFFICER: 345 West 50th Street, NEW YORK CITY

The Tulane University of Louisiana

GRADUATE SCHOOL OF MEDICINE

POSTGRADUATE instruction offered in all branches of medicine.

Review Courses:
January 4 to February 13, 1937.
February 15 to March 27, 1937.
March 29 to May 8, 1937.

SPECIAL COURSES:
Gastroenterology, beginning March 29, ending April 24, 1937.
Surgery, Gynecology and Obstetrics, beginning May 10, ending June 5, 1937.
Tropical Medicine and Parasitology, beginning June 14, ending July 24, 1937.

COURSES leading to a higher degree are also offered.

For bulletin furnishing detailed information address the

DEAN GRADUATE SCHOOL OF MEDICINE

1430 Tulane Avenue
New Orleans, La.

Harvard Medical School Courses for Graduates

General Course in Orthopaedic Surgery

By Professor Ober and Associates at the Children's and Massachusetts General Hospitals and Harvard Medical School.

March 29 - May 8, inclusive. Fee $150.

The course will consist of clinical and didactic work supplemented by instruction in Operative Orthopaedic Surgery on the cadaver. It is designed to meet the needs of surgeons, industrial physicians, and other qualified practitioners of medicine desiring a systematic review of bone and joint lesions and the opportunity of familiarizing themselves with orthopaedic methods and technic.

Apply to Assistant Dean, Courses for Graduates, Harvard Medical School, Boston, Massachusetts

Washington University School of Medicine

Announces the following courses in

Otolaryngology

for graduates:

An eight months' course in Otolaryngology for those beginning the study of diseases of the ear, nose and throat.

The course begins October 11, 1937. Fee for the course is $600.00.

An intensive four weeks' course in Otolaryngology. This course is for otolaryngologists. The course begins April 12, 1937. Fee for the course is $150.00.

For further information apply to

THE REGISTRAR
WASHINGTON UNIVERSITY
SCHOOL OF MEDICINE
St. Louis, Missouri

Norris Clinical Laboratories

JACK C. NORRIS, M.D., Director

Pathology, Clinical Pathology, Medico-legal Medicine.

Blood Cultures. **Spinal fluids. Kahn** and **Lewis** tests for syphilis. **Frei** tests for lymphogranuloma. **Aschheim-Zondek test for pregnancy** (early morning specimen 3 ounces, urine sterile bottle needed), report 24 hours later or earlier if desired. **Diagnosis of cancer** by frozen section, immediate report by telegram, with grading of tumor by **Broders method. Blood chemistry,** calcium, phosphorous, etc. **Complete blood studies** for blood dyscrasias of all types. **Vaccines** for **boils, colitis** and **arthritis. Special media** furnished for streptococcal infections. **Agglutination tests** for diagnosis of obscure fevers (typhus, undulant, typhoid, etc.). **Autopsies** performed by appointment with chemical tests for poisons when needed.

Address
DR. JACK C. NORRIS
Phone Walnut 6057 810 Doctors Bldg.
ATLANTA, GA.

To Invite *RESTFUL SLEEP—*

Take a warm drink before retiring to promote sound restful sleep. A cupful of Horlick's, hot, is delicious, soothing and nourishing.

We invite you to listen to . . .
LUM AND ABNER
Every night except Saturday and Sunday
NBC Blue Network

HORLICK'S MALTED MILK CORP.
Racine, Wis.

Improved and Enlarged Laboratory Course

In line with our policy of turning out accomplished laboratory technicians we announce our course of

NINE FULL MONTHS
plus four to six months' internship in a hospital laboratory

Send for Catalogue

Gradwohl School of Laboratory Technique

3514 Lucas Avenue
St. Louis, Mo.
R. B. H. GRADWOHL, M.D., Director

St. Elizabeth's Hospital

RICHMOND, VIRGINIA

Staff

J. Shelton Horsley, M.D., Surgery and Gynecology
John S. Horsley, Jr., M.D., Plastic and General Surgery
Guy W. Horsley, M.D., General Surgery and Proctology.
Douglas G. Chapman, M.D., Internal Medicine
Wm. H. Higgins, M.D., Consultant in Internal Medicine
Austin I. Dodson, M.D., Urology
Fred M. Hodges, M.D., Roentgenology
L. O. Snead, M.D., Roentgenology
Thos. W. Wood, D.D.S., Dental Surgery
Helen Lorraine, Medical Illustration

Assistant Attending Staff

Harry J. Warthen, Jr., M.D., Surgery
W. K. Dix, M.D., Internal Medicine
J. P. Baker, Jr., M.D., Internal Medicine
Marshall P. Gordon, Jr., M.D., Urology

Administration

N. E. Pate ..... Business Manager

• The operating rooms and all of the front bedrooms are now completely air-conditioned.

SCHOOL FOR NURSES

The Training School is affiliated with **Johns Hopkins Hospital** in Baltimore for a three months' course each, in Pediatrics and Obstetrics.

Address: DIRECTOR OF NURSING EDUCATION

THE TUCKER SANATORIUM, INC.

212 West Franklin St. (Corner of Madison)

RICHMOND, VIRGINIA

This is the private Sanatorium for the Neurological Practice of Drs. Beverley R. Tucker, Howard R. Masters and James Asa Shield.

The Tucker Sanatorium is for the treatment of nervous and endocrine diseases. There are departments of massage, medicinal exercises, hydrotherapy and physiotherapy. The Sanatorium is large and bright, surrounded by a lawn and shady walks, large verandas and has a roof garden. It is situated in the best part of Richmond and is thoroughly and modernly equipped. The nurses are specially trained in the care of nervous cases.

Insane and acute alcoholic cases are not taken.

WAUKESHA SPRINGS SANITARIUM

For the Care and Treatment of

NERVOUS DISEASES

Building Absolutely Fireproof

BYRON M. CAPLES, M.D., Medical Director
FLOYD W. APLIN, M.D.

Waukesha, - - - - Wisconsin

The Ella Oliver Home

A private maternity home for the care and protection of unfortunate girls during pregnancy and confinement. Under auspices of Women's Christian Association of this city.

Staff physician in daily attendance or may have any other ethical physician. Modern hospital equipment, graduate nurse. Rates very reasonable. Adoption or board arranged for babies.

Strictest privacy is maintained, correspondence confidential.

For information, address

ELLA OLIVER HOME MEMPHIS, TENN.
903 Walker Ave. Phone: 3-0639

The "MESCO" Laboratories manufacture the largest line of Ointments in the world. Sixty different kinds. We are originators of the Professional Package. Specify "MESCO" when prescribing ointments. Send for lists.

Manhattan Eye Salve Co.

LOUISVILLE, KENTUCKY

Alcoholism
Senility
Drug Addiction

A Modern Ethical Hospital at Louisville

Founded 1904

Mental and Nervous Diseases

BEAUTIFUL AND SPACIOUS GROUNDS AFFORD OUTDOOR RELAXATION

Our **ALCOHOLIC** treatment destroys the craving, restores the appetite and sleep, and rebuilds the physical and nervous condition of the patient. Whiskey withdrawn gradually; no limit on the amount necessary to prevent or relieve delirium.

MENTAL patients have every comfort that their home affords.

The **DRUG** treatment is one of gradual Reduction; it relieves the constipation, restores the appetite and sleep; withdrawal pains are absent. No Hyoscine or rapid withdrawal methods used unless patient desires same.

NERVOUS patients are accepted by us for observation and diagnosis, as well as treatment.

Select cases of SENILITY accepted. **Physiotherapy—Clinical Laboratory—X-Ray.** **Consulting Physicians.**

Rates and folder on request

THE STOKES HOSPITAL

Incorporated

Telephone, Highland 2101

E. W. STOKES, M.D., Medical Director, 923 Cherokee Road, Louisville, Ky.

DR. MOODY'S SANITARIUM

SAN ANTONIO, TEXAS

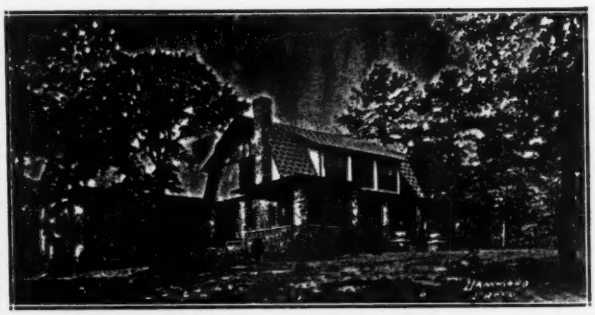
315 Brackenridge Avenue. **Phone: Fannin 5522**

For Nervous and Mental Diseases, Drug and Alcohol Addiction and Nervous Invalids Needing Rest and Recuperation

Established 1903. Strictly ethical. Location delightful summer and winter. Approved diagnostic and therapeutic methods. Seven buildings, each with separate lawns, each featuring a small separate sanitarium, affording wholesome restfulness and recreation, in doors and out doors, tactful nursing and homelike comforts.

G. H. MOODY, M.D.
Founder

J. A. McINTOSH, M.D., F.A.C.P.
Superintendent



Hoye's Sanitarium

"In the mountains of Meridian"

MERIDIAN, MISS.

For nervous and mental diseases, drug and alcohol addiction, rest and recuperation. Ten acres of beautiful grounds sufficiently removed from highway to insure privacy. All out-side rooms, connecting baths. Modern treatment.

Dr. M. J. L. Hoye, Supt.,
Formerly sixteen years Superintendent of East Mississippi State Hospital.

Saint Albans Sanatorium

RADFORD, VA.

A modern, ethical institution, fully equipped for the diagnosis, care and treatment of nervous and mental diseases and selected addiction cases. 2,000 feet elevation. Rates reasonable. Occupational and Hydrotherapy Departments.

J. C. KING, M.D. **JAMES KING, M.D.**
FRANK A. STRICKLER, M.D.

McGUIRE CLINIC

ST. LUKE'S HOSPITAL

Richmond, Virginia

. . . Medical and Surgical Staff . . .

General Medicine:
James H. Smith, M.D.
Hunter H. McGuire, M.D.
Margaret Nolting, M.D.
Kinloch Nelson, M.D.
Clifford H. Beach, M.D.

Orthopedic Surgery:
William T. Graham, M.D.
D. M. Faulkner, M.D.
J. T. Tucker, M.D.

General Surgery:
Stuart McGuire, M.D.
W. Lowndes Peple, M.D.
Carrington Williams, M.D.
W. P. Barnes, M.D.

Pathology and Radiology:
S. W. Budd, M.D.

Roentgenology:
J. L. Tabb, M.D.

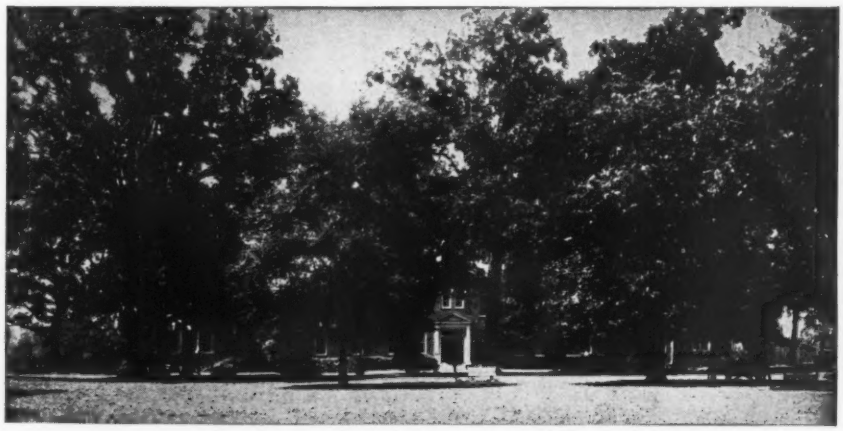
Obstetrics:
H. Hudnall Ware, Jr., M.D.

Urology:
Austin I. Dodson, M.D.

Eye, Ear, Nose and Throat:
F. H. Lee, M.D.

Dental Surgery:
John Bell Williams, D.D.S.
Guy R. Harrison, D.D.S.

WALTER R. WALLACE, M.D. O. A. SCHMID, M.D. HUGH W. PRIDDY, M.D.



THE WALLACE SANITARIUM

MEMPHIS, TENN.

For the treatment of Drug Addiction, Alcoholism, Mental and Nervous Diseases. Fully equipped for the care of patients admitted. Sixteen acres of beautiful grounds. Located in the eastern suburbs of the city at Southern Avenue and Cherry Road.

WESTBROOK SANATORIUM

Richmond *Virginia*

TELEPHONE: 5-3245

Department for Men:
J. K. Hall, M.D.

Associates:
O. B. Darden, M.D.
E. H. Alderman, M.D.
E. H. Williams, M.D.
Rex Blankinship, M.D.

Department for Women:
P. V. Anderson, M.D.

The institution is situated just beyond the northern border of the city on United States Highway Number 1.

The scope of the work of the sanatorium is limited to the diagnosis and the treatment of nervous and mental disorders and to the addictions to drugs and to alcohol. It affords also adequate facilities for rest and upbuilding under medical and nursing supervision.

The medical staff devotes its entire attention to the patients in the Sanatorium.

The institution maintains a school for trained attendants in which instruction in the care of the nervous and mentally sick is emphasized.

There are twelve separate buildings for patients, with 150 beds. Such a large group of buildings makes possible the more congenial grouping of patients. Rooms may be had single or en suite, with or without private bath. There are a few small cottages for the use of individual patients.

A comprehensive general physical and nervous examination is made of each patient. A mental examination is made when indicated. The examination is typed and a copy of it is available for the referring physician. Complete dental investigation is a part of the general survey.

A skilled teacher gives practical daily instruction to small groups in the arts and crafts. Helpful and interesting occupation in the out-of-doors is made possible for the men patients in the vegetable and flower gardens, on the truck farm, in the poultry yards, and in the dairy.

There are bowling, tennis, croquet and pool. On Sunday evening there is chapel service.

Detailed information is available for physicians.

Dr. Brawner's Sanitarium

SMYRNA, GEORGIA
(Suburb of Atlanta)

● *For Nervous and Mental Disorders, Drug and Alcohol Addictions*

Approved diagnostic and therapeutic methods. Hydrotherapy, Electrotherapy, Massage, X-ray and Laboratory.

Special Department for General Invalids and Senile Cases at Monthly Rates.

JAMES N. BRAWNER, M.D., Medical Sup't.
ALBERT F. BRAWNER, M.D., Resident Sup't.

Grace Lutheran Sanatorium
FOR TUBERCULOSIS

SAN ANTONIO, TEXAS

ADMITS patients irrespective of religion or creed. An attractive institution in beautiful San Antonio. Climate unexcelled the year round for treatment of tuberculosis. Private rooms with bath and sleeping porch; individual cottages; high-class accommodations; Radiographic and Fluoroscopic service. Every room and cottage equipped with radio.

MODERATE RATES

For booklet and information address

REV. PAUL F. HEIN, D. D., Superintendent
701 South Zarzamora Street **San Antonio, Texas**

STUART CIRCLE HOSPITAL

Richmond, Virginia

Medicine:
MANFRED CALL, M.D.
ALEXANDER G. BROWN, JR., M.D.
OSBORNE O. ASHWORTH, M.D.
MANFRED CALL, III, M.D.
M. MORRIS PINCKNEY, M.D.
ALEXANDER G. BROWN, III, M.D.

Obstetrics:
GREER BAUGHMAN, M.D.
BEN H. GRAY, M.D.
WM. DURWOOD SUGGS, M.D.

Ophthalmology, Otolaryngology
CLIFTON M. MILLER, M.D.
R. H. WRIGHT, M.D.
W. L. MASON, M.D.

Physiotherapy:
ELSA LANGE, B.S., Technician
MARGARET CORBIN, B.S., Technician

Medical Illustrator:
DOROTHY BOOTH

Surgery:
CHARLES R. ROBINS, M.D.
STUART N. MICHAUX, M.D.
ROBERT C. BRYAN, M.D.
A. STEPHENS GRAHAM, M.D.
CHARLES R. ROBINS, JR., M.D.

Pathology:
REGENA BECK, M.D.

Urological Surgery:
JOSEPH F. GEISINGER, M.D.

Oral Surgery:
GUY R. HARRISON, D.D.S.

Roentgenology and Radiology:
FRED M. HODGES, M.D.
L. O. SNEAD, M.D.
R. A. BERGER, M.D.

Stuart Circle Hospital has been operated twenty-three years, affording scientific care to patients in General Medicine, Surgery, Obstetrics and the various medical and surgical specialties. Detailed information furnished physicians.

CHARLOTTE PFEIFFER, R.N., Superintendent

CITY VIEW SANITARIUM

For MENTAL and NERVOUS DISEASES and ADDICTIONS

ESTABLISHED IN 1907
AN ENTIRELY NEW PLANT ERECTED IN 1922

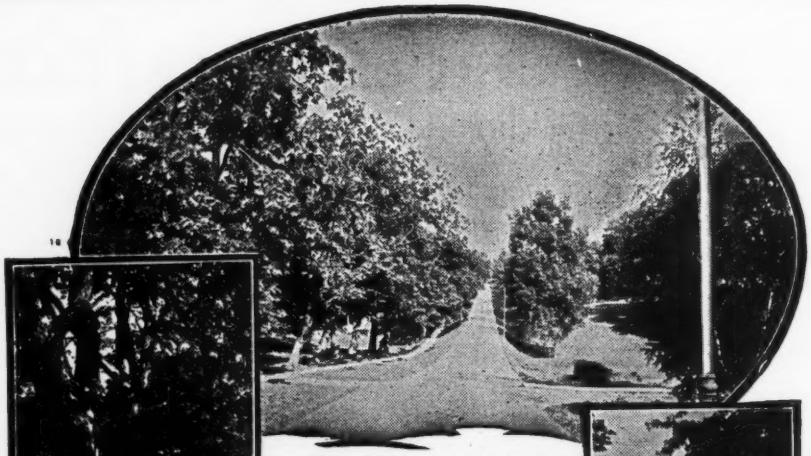
Separate buildings for men and women, ideally arranged and equipped with every facility for the comfort, care and treatment of the class of patients received. Situated in the midst of a fifty-acre tract, and surrounded by large groves and attractive lawns. Two resident physicians. Training school for nurses.

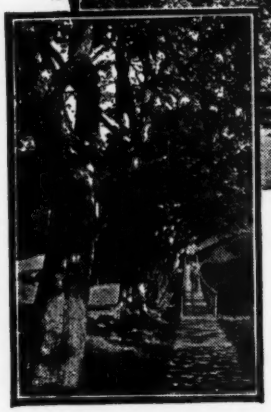
References: The Medical Profession of Nashville

JOHN W. STEVENS, M.D., Physician-in-Charge

NASHVILLE R. F. D. No. 1 TENNESSEE

On Murfreesboro Pike, one-half mile east of old location





The Cincinnati Sanitarium
Inc. 1873

For Mental and Nervous Diseases

A strictly modern hospital fully equipped for the scientific treatment of nervous and mental affections. Situation retired and accessible. For details write for descriptive pamphlet.

Emerson A. North, M.D.
Charles Kiely, M.D.
Visiting Consultants

D. A. Johnston, M.D.,
Medical Director

H. P. COLLINS, Business Manager
Box No. 4, College Hill
CINCINNATI, OHIO

"REST COTTAGE" College Hill, Cincinnati, Ohio

For purely nervous cases, nutritional errors and convalescents.

Completely equipped for hydrotherapy, massages, etc.

Cuisine to meet individual needs.

Emerson A. North, M.D.
Charles Kiely, M.D.
Visiting Consultants

D. A. Johnston, M.D., Medical Director

H. P. Collins, Bus. Mgr., Box No. 4, College Hill, Cincinnati, Ohio

HILL CREST SANITARIUM

FOR NERVOUS AND MENTAL DISEASES AND ADDICTIONS

Established in 1925

A NEW PLANT WAS COMPLETED IN 1930

Thoroughly modern in architecture and construction. Eight departments—affording proper classification of patients. All outside rooms, attractively furnished. Several bathrooms and rooms with private bath on each floor. Also a spacious sun parlor in each department. Located on the crest of Higdon Hill, 1050 feet above sea level, overlooking the city, and surrounded by an expanse of beautiful woodland. Ample provision made for diversion and helpful occupation. Adequate night and day nursing service maintained.

JAMES A. BECTON, M.D., Physician-in-Charge

P. O. Box 96, Woodlawn Station, Birmingham, Ala. **Phones: 9-1151 and 9-1152**

Consultants: C. M. Rudulph, M.D.; H. S. Ward, M.D.; W. S. Littlejohn, M.D.

APPALACHIAN HALL

Asheville, North Carolina

An Institution

FOR

Rest,
Convalescence,

the diagnosis and treatment of

NERVOUS
AND
MENTAL
DISORDERS,
ALCOHOL
AND
Drug Habituation

Appalachian Hall is located in Asheville, North Carolina. Asheville justly claims an unexcelled all year round climate for health and comfort. All natural curative agents are used, such as physiotherapy, occupational therapy, outdoor sports, horseback riding, etc. Five beautiful golf courses are available to patients. Ample facilities for classification of patients. Rooms single or en suite with every comfort and convenience.

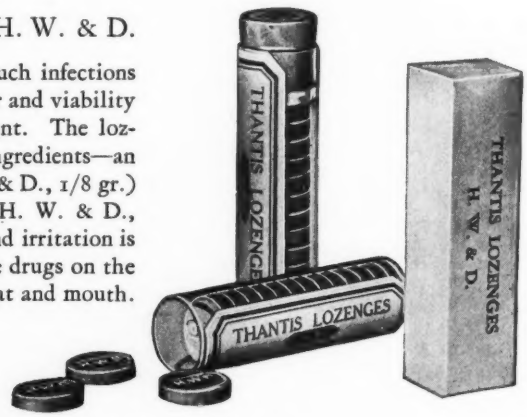
For rates and further information write
Appalachian Hall, Asheville, N. C.

WM. RAY GRIFFIN, M.D. M. A. GRIFFIN, MD.

FOR the relief of various throat affections common in winter many physicians regard Thantis Lozenges, H. W. & D., as one of the most useful agents.

THANTIS LOZENGES, H. W. & D.

are helpful in the control of such infections because they reduce the number and viability of pathogenic organisms present. The lozenges contain two active ingredients—an antiseptic (Merodicein, H. W. & D., 1/8 gr.) and an anesthetic (Saligenin, H. W. & D., 1 gr.). Relief from soreness and irritation is provided by the action of these drugs on the mucous membranes of the throat and mouth.



Complete information and literature on request.

HYNSON, WESTCOTT & DUNNING, INC.

BALTIMORE, MARYLAND

SOUTHERN MEDICAL JOURNAL
JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION
PUBLISHED MONTHLY BY THE SOUTHERN MEDICAL ASSOCIATION AT BIRMINGHAM, ALA.

Volume 30 FEBRUARY 1937 Number 2

CANCER OF THE OVARY*

By JOE VINCENT MEIGS, M.D.
Boston, Massachusetts

The subject of cancer of the ovary, and the literature concerning it, is very large. The reports of results of treatment are so confusing that a review of the material from our hospital is not amiss at this time. The usual absolute five-year "cure" end results of most tumors average 20 to 25 per cent. Cancer of the cervix in our own hospital series shows a 24 per cent five-year curability, and cancer of the breast a 25 per cent five-year curability in cases with positive nodes in the axilla. As will be demonstrated in this paper, the end results in cancer of the ovary are worse than the usual cancer curability; it therefore seems pertinent to review a series and point out any means of making an early diagnosis and any mistakes or successes in treatment. With a prognosis of about 14.8 per cent cured in a series of 135 well studied cases the seriousness of such tumors is apparent.

EMBRYOLOGY AND HISTOLOGY

It is not the purpose of this paper to describe in detail the embryology of the ovary, but it is important to record that as it arises in a primitive tissue capable of producing all of the generative organs, both male and female, and as it is in close proximity to the developing adrenal gland and kidney, it is by right a "hot bed" of cellular remains and anlagen. The ovary arises from both the outer and inner cell masses; the outer probably produces the germinal epithelium and the ova; and the inner, the indifferent sex cells or undifferentiated germ cells, as well as being the site of testicular anlage. It is no wonder, then, that small glandular remains are often seen in the ovary. In the microscopic study of the tumors of the ovary for this report it was the author's desire to be able to interpret intelligently all the epithelium-like structures seen in the ovary, but this was given up early in the study as being an impossible task. Perhaps some keen histologist might be able to interpret all these structures, but for some of us the task is too difficult. Bearing in mind the potentialities of the ovary also as a producer of eggs and as a secretor of two hormones, it is not at all difficult to understand the activity of the tumors and their great variability.

MATERIAL

This study constitutes a survey of the ovarian tumors in the records of the Massachusetts General Hospital from 1901 to 1931, a period of thirty years. All ovarian tumors and cysts were grouped together and followed for at least five years, and some much longer. The history of each case was carefully abstracted and analyzed, the microscopic slide of each tumor was seen and studied, and any doubtful diagnoses were checked by the hospital pathologist, Dr. Tracy B. Mallory. If a tumor was called malignant in the hospital records and if the slides did not suggest a malignant tumor, it was discarded; and the reverse is true, numbers of the so-called benign tumors proving to be malignant. No case was accepted as an ovarian tumor if the operation disclosed the whole abdomen full of cancer and the original source could not be definitely determined. No metastatic lesion was accepted as a tumor of the ovary in this series. There were a few cases of general peritoneal implantation of the pseudomucinous type that were ruled out because microscopically these tumors were benign and in addition the patient was living from ten to fifteen years, a proof of the value of the microscopic diagnosis. All tumors of peculiar or "odd" type were also excluded

*Read in Section on Gynecology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Surgical Services of the Massachusetts General Hospital.

and in this category were placed a number of granulosal cell tumors, sarcomas, teratomas (dermoids), Krukenberg tumors, one luteoma, and others. This was done because the "odd" epithelial growths are very different from the usual types in their behavior and because some (sarcomas) were not of epithelial origin at all. The author's aim was to include only those malignant epithelial growths of solid or cystic types. The exclusion of the above groups and of those tumors diagnosed as ovarian by peritoneal biopsy reduced the number to 135. This is not a great number, but malignant tumors of the ovary are not common and a series as large as this is a satisfactory one for study. All patients not followed, and there were not many of these, were included as having died of the disease. In all instances the slides of the tumor of each case were carefully checked for this study, and if a slide was lost or misplaced the case was discarded and not included in the statistics at all.

TYPES OF TUMORS, GROSS AND HISTOLOGIC

From the ovary may arise, as has been said, all sorts of tumors, large, small, papillary, smooth-walled, cystic, solid, and solid and cystic, white, yellow, bloody, and so on. There are three types of tumors that can be identified: the pseudomucinous, the endometrial, and the unclassified. Histologically the easiest group to differentiate are the pseudomucinous ones. These are usually similar, the malignant papillary lesion of this sort being very easy to differentiate from the other types. The solid pseudomucinous tumor, which is rather a rarity, also is typical and the diagnosis easy. There is another rather distinctive type growing in papillary and solid and cystic forms that resembles the endometrium. As the celomic epithelium can easily produce endometrium, it is not surprising that this type of tumor occurs. Some parts of such a tumor, however, may become atypical and no evidence of an endometrial type can be seen. Tumors of the unclassified group are histologically so different that no two seem to be alike. They have been grouped as unclassified, although occasionally areas of well-differentiated epithelium may be found. The most bizarre and peculiar types of epithelium may be present in all stages of growth, from the most rapidly growing to a very slowly growing type. The unclassified group is one of exclusion, for if the tumor could not be classed as pseudomucinous or endometrial it was called unclassified. Many papillary tumors also grow in solid cords and many of the solid tumors have occasional areas of papillary adenocarcinomatous growth.

The criteria of malignancy have been the evidence of mitotic activity, the invasion of the walls of cysts with growing cells, a certain degree of undifferentiation, and in the papillary growths, the presence of areas which if seen alone would be classified as adenocarcinoma or papillary adenocarcinoma. There was no doubt of the malignancy of a tumor before it was included in the study. The regularity of the papillae, the regularity and differentiation of the cells, the lack of invasion of the walls of the cysts, and the lack of mitoses as evidence of cell growth was sufficient to classify a tumor as benign. The end results of patients with this benign type of tumor uphold the judgment of the diagnosis made. Among tumors diagnosed twenty and more years ago were many benign tumors classified as malignant, and the reverse was also true. It is the belief of the author that no review of tumors of the ovary reported from hospital records and old pathologic reports is a satisfactory one. The careful histologic investigation of each tumor by the hospital pathologist and the writer himself should be made the ideal for reports of end results in any cancer series. The possibility of misinterpretation in the pathology laboratory when information of the clinical side is not available makes reports and statistics of uninvestigated cases almost useless.

ENTIRELY SOLID AND SOLID PLUS CYSTIC CARCINOMA OF THE OVARY

This group is by far the most serious; the operability is small and the prognosis poor. By the solid type of tumor is meant a tumor with no cysts except those caused by areas of necrosis. The solid and cystic tumors are those with thick walls invaded by cancer with large masses of cancer tissue present in the cyst. This type may be due to marked necrosis and liquefaction or to a massive growth of carcinoma from and into the wall of a malignant cyst. These types of tumors may be large or small, but must have at least one-half of their bulk made up of solid cancer tissue. The histology is rarely the same in any two tumors, but the gross pathology may be very similar. These tumors grow as medullary, schirrous, squamous, adeno or papillary adenocarcinomas. The type cell may be pseudomucinous, endometrial, and

unclassified. In rare instances, especially when a patient is operated upon for another tumor of the ovary, the transition from a malignant papillary lesion to a solid tumor seems to occur. It is possible that some of the solid tumors started as papillary growths and gradually progressed from one to the other. The diagnosis is difficult and the symptoms and physical findings are presented in the table below (*Table 1*).

Table 1

SOLID CARCINOMA—63 CASES

Symptoms and Physical Findings	Per Cent
Well developed and nourished	60.3
Pain	68.2
Abdominal swelling	52.3
Loss of weight	38
Ascites	38
Urinary symptoms	25.4
Duration before operation one year and under	60.7
Ages: 30 to 50	50.7
Fertility (married women)	62.5
Catamenia	
Regular	33.3
Menopause	49.2
Abnormal bleeding	30.1
(After menopause)	6.3

A study of these cases has made the following impression upon us: that if, in any woman past the age of 40, a hard area is felt in either vault (either smooth or cystic) the first duty of the surgeon is to see that she is operated upon at once. It is also his intention to be more radical in the treatment of ovaries when operating upon patients past the age of 45. There are no pronounced symptoms and there is no way that this lesion can be diagnosed except at operation, but the finding of any suggestive pathologic condition in the ovary, especially if it is hard, should demand investigation. Solid tumors of the ovary can be present in patients with abnormal bleeding both before and after the menopause. They may even be responsible for the estrin phase or abnormal phase of the endometrium from which the bleeding comes, but it is not always essential that a menstrual upset be present. The finding of estrin in the urine after the menopause may be of some value in determining the presence of an ovarian lesion, for its presence must mean the presence of estrin secreting tissue or active ovarian substance. As these tumors are often bilateral, and as the ovary of one side is probably subject to the same embryological defects as the other side, both ovaries are dangerous. No attempt should ever be made to conserve the opposite ovary in a patient with carcinoma of the ovary. Radical surgery, and this includes hysterectomy and if possible total hysterectomy, is necessary. These tumors metastasize far and wide and patients may return years after their operation with recurrences in any part of the body. Their malignancy is great and special care must be taken to do as radical an operation as the patient's condition permits. X-ray treatment is of some value in prolonging the life of these patients, but it does not result in a "cure" and very little reliance should be placed upon its subsequent use. There is a great void to be filled in the means of making a diagnosis of this treacherous lesion. X-ray investigations are of no use as in cancer of the stomach and colon; visualization is not possible as in mouth and cervical cancer; biopsy is not possible as in cancer of the endometrium; but perhaps in the peritoneoscope lies our most satisfactory means of making an early diagnosis, and it probably will be necessary in the near future for every clinic to have an expert with this new instrument to make the diagnosis for the surgeon. The surgeon perhaps should become expert in the use of this instrument, as many are in the use of the diagnostic cystoscope, proctoscope, and colposcope.

MALIGNANT PAPILLARY CYSTADENOMA WITH AREAS OF ADENOCARCINOMA

This arbitrary division of malignant papillary cysts is not without justification, for the end results show that this type of lesion has a worse prognosis than the malignant papillary cyst. Any papillary cystic tumor that microscopically has an area that suggests adenocarcinoma in its wall is included in this group. The pseudomucinous cysts are the least malignant and the endometrial the most; while the unclassified type lies between the two. These tumors spread as do the solid tumors, but without quite such regularity and finality. The same radical surgery should be used in their treatment: as radical as the condition of the patient will permit. It is very essential after removal of a cyst of the ovary to open it before closing the abdomen. If there are papillary projections on the inside of the tumor with a suggestion of thickening in the wall of the cyst near the site of the papillary process, the other ovary and the uterus should be removed. This is a procedure of utmost importance if cures are to be obtained. Papillary growth takes any ovarian tumor out of the benign class into the suspiciously malignant class, and it is far wiser to err on the side of radical surgery than to leave behind a poten-

tial cancer, even though the ovary may function normally for a while. It is often the custom for surgeons to empty the cysts by means of a trocar before removing them. Although the results seem to show this does no harm, it is the conviction of the author that in some cysts with loose particles floating in their fluid this treatment has a great element of danger. It ought to be safer to remove a cyst without spilling than to tap and allow contamination to take place. Certainly great care is exercised not to spill cells of other cancers into the surrounding tissues and why these lesions should be considered different from others is hard to comprehend. Careful dissection with the emphasis placed on non-rupture and careful closure of the very large wound necessary to remove some of the large lesions is better for the patient in the end than is the tapping of a malignant cyst. If there is any doubt as to the malignancy of a cyst, the time to open it is when it is safely outside the abdomen rather than to do a biopsy with the cyst in place. Modern methods of surgery dictate that there should be no spilling of cancer cells and this should certainly apply to malignant cysts as well as to malignant breasts. Perhaps as in the case of solid cancer, peritoneoscopy will be our best diagnostic aid. The prognosis is poor and will remain so until a way is found to make earlier diagnosis from the history, physical findings, laboratory tests, and other diagnostic methods. *Table 2* below gives the symptoms and physical findings of the two combined types of malignant papillary cysts.

MALIGNANT PAPILLARY CYSTADENOMA

This cystic lesion is not so malignant as the other two and yet its treatment is not satisfactory (*Table 2*). The unclassified type is the least serious, the pseudomucinous the next, and the endometrial the most. These tumors progress just as do the other two groups and care must be taken to remove the cyst unruptured and to do radical surgery without regard to the age of the patient and only with regard to the condition of the patient. These cysts should not be tapped prior to removal and if fluid is present in the abdomen before operation, then paracentesis should be done in such a way that the cyst is not ruptured.

Table 2

MALIGNANT PAPILLARY CYST WITH ADENOCARCINOMA COMBINED WITH MALIGNANT PAPILLARY CYST, 72 CASES

Symptoms and Physical Findings	Per Cent
Well developed and nourished	51.4
Abdominal swelling	58.3
Ascites	54.2
Pain	52.8
Loss of weight	49
Urinary symptoms	38.8
Duration before operation one year and under	48.2
Ages: 30 to 50	47.2
Fertility (married women)	60.8
Catamenia	
Regular	33.3
Menopause	45.8
Abnormal bleeding	22.2
After menopause	13.8

PSEUDOMUCINOUS TUMORS, ENDOMETRIAL TUMORS, AND UNCLASSIFIED TUMORS

Here an endeavor will be made to show how the cell type affects the prognosis. Unquestionably the pseudomucinous is the most differentiated type and yet it is not the least malignant. The unclassified group seems to do better statistically, probably because in this group are many very highly differentiated, slowly growing lesions as well as many undifferentiated lesions, the result being that the curability figures are better than those of the other two groups. Because the pseudomucinous tumor is such a satisfactory tumor compared to the others, great care must be experienced in its removal.

The endometrial type is also quite differentiated; it resembles a true adenocarcinoma of the body of the uterus in some of its stages; and it has a poorer prognosis than the unclassified type. Once this type of tumor breaks outside of its capsule the danger is as great as that in an adenocarcinoma of the endometrium that has metastasized to the peritoneum. It becomes about the most malignant of all tumors. These tumors along with the unclassified group have been usually grouped under the old classification, "serous cystadenoma." The serous cystadenoma is a division made according to the type of fluid contained in the cyst and not as the pseudomucinous type, which is divided off because of the character of the fluid and cell type. The serous cystadenoma division therefore cannot be a satisfactory one and a division into groups depending upon the cell type should be more satisfactory.

The unclassified group includes those cell types that are neither pseudomucinous nor endometrial and thus includes most of the undifferentiated types of growth. These tumors were at one time considered under the serous classification, but it is more satisfactory to call the tumor unclassified than to group the endometrial and the unclassified together, because its fluid is not pseudomucinous.

The unclassified tumors need further study. It is quite probable that later a division into some other cell types will take place, such as cysts of the rete ovarii or cysts of the germinal epithelium. At the present time this cannot be done and into the unclassified group go all the odd, undifferentiated and most malignant lesions as well as some of the most differentiated. *Table 3* gives the results in each group according to the cell type.

Table 3
RESULTS

	Solid Carcinoma	Malig. Pap. Cyst with Adenocarcinoma	Malig Pap. Cyst	Malig. Pap. Cyst plus Malig. Pap. Cyst with Adenocarcinoma
Total No. cases	63	36	36	72
Per cent living	6.3	22.2	22.2	22.2
Per cent pseudomucinous	4.7	22.2	47.2	34.7
Per cent living	*0	†50	*11.7	*21.4
Per cent endometrial	14.2	27.7	13.8	20.8
Per cent living	†11.1	*10	*20	*15
Per cent unclassified	80.9	50	38.8	44.4
Per cent living	*5.8	*16.6	†35.7	†26.2

*Worse than percentage living for group.
†Better than percentage living for group.

SYMPTOMS

An investigation of this type must be presented first as a clinical paper endeavoring to bring out certain statistics of practical value and later perhaps as a paper of more analytical statistical comparisons. All of the figures used below can be found in the tables presented in the essay.

One-half of the patients with malignant epithelial tumors of the ovary are in the decades 30 to 40 and 40 to 50. In all groups about the same percentage is found. There are more young patients in the malignant papillary cystadenoma group than in the solid carcinoma group or in the seriously malignant group of malignant papillary cystadenoma with adenocarcinoma in the wall. The fertility of the married women in both the solid tumors and the cystic tumors is approximately the same, 60 per cent. This is a low incidence of fertility, as 90 per cent of fertile marriages is the usual finding. The catamenial history shows that only 33 per cent of both groups are menstruating regularly and normally, 40 to 50 per cent have had the menopause, while about 30 per cent give a story of abnormal bleeding. It is interesting to note, in this series of cases where tumors of endocrine significance have been weeded out, that 6.3 per cent of the solid tumors and 13.8 per cent of the cystic ones are accompanied by bleeding after the menopause. It is correct to assume that some estrin is being produced by tumor cells that have their origin from some of the cells of the ovary which are capable of producing the ovarian hormone.

A large majority of all the patients were well developed and nourished and a few were even obese; 21 per cent of the entire group were reported as thin and these were probably those who showed definite signs of malignant disease in their physical make-up. Pain was the commonest symptom: 68.2 per cent of the solid carcinomas and 52.8 per cent of the cystic tumors complained of pelvic discomfort or pain. Over 50 per cent of both groups complained of abdominal swelling, and loss of weight was noted in about half of the cystic tumors and a third of the solid ones. Urinary symptoms were not uncommon, being present in 38.8 per cent of the cystic tumors and 25.4 per cent of the solid ones. These symptoms of abdominal swelling, pelvic discomfort and pain, loss of weight, and urinary symptoms should make one consider the possibility of a malignant tumor of the ovary. If one adds to this the presence of ascites which occurs in 38 per cent of the solid tumors and 54.2 per cent of the cystic ones, the diagnosis should be possible. Ascites does not necessarily mean a hopeless tumor, for even the simple cysts and simple solid tumors of the ovary are accompanied by it. It is interesting to note that among the solid tumors the percentage of patients with symptoms bringing them to operation within a year of onset was greater than in the less malignant or cystic group, 60.7 per cent as against 48.2 per cent.

INOPERABLE GROUP

In the series there were many inoperable cases, cases that were simply explored and closed and a biopsy taken. This was all that could be done in over one-fourth of the solid group and in one-seventh of the cystic group. The facts that there were more patients in the solid group who had a shorter history from the onset to the time of operation and that there were more inoperable cases are evidence that this tumor is

a much more serious one than the cystic type (*Table 4*).

Table 4

	Solid Carcinoma	Malig. Pap. Cyst with Adeoncarcinoma	Malig. Pap. Cyst	Malig. Pap. Cyst plus Adenocarcinoma and Malig. Pap. Cyst
Total No. Cases	63	36	36	72
Per cent inoperable	26.9	5.5	25	15.3
Unilateral oophorectomy, per cent	23.8	36.1	27.7	31.9
Cases living, per cent	†6.6	†30.7	†30	†30.3
Bilateral oophorectomy, per cent operable cases	54.3	55.8	38.4	47.1
Cases living, per cent	†12	*21	†30	†25.5
Bilateral tumors, per cent	36.5	44.4	36.1	40.3
Cases living, per cent	*4.3	*12.3	†38.5	†25.4

*Worse than percentage living for group.
†Better than percentage living for group.

Table 5

	Solid Carcinoma	Malig. Pap. Cyst with Adeoncarcinoma	Malig. Pap. Cyst	Malig. Pap. Cyst plus Adenocarcinoma and Malig. Pap. Cyst
Total No. Cases	63	36	36	72
Subsequent occurrence of tumor in opposite ovary, per cent	.....	5.5	2.7	4.1
Uterine involvement, per cent	11	11.1	5.5	8.3
Living, per cent	.....	†25	.....	*12.3
Adhesions, per cent	49	52.7	41.6	47.1
Living, per cent	*3.2	†26.3	†26.6	†26.4
Cyst ruptured during or before operation, per cent	20.6	30.5	33.3	31.9
Living, per cent	†7.6	†36.5	†33.3	†34.7

*Worse than percentage living for group.
†Better than percentage living for group.

BILATERAL VERSUS UNILATERAL OOPHORECTOMY

The tumors were bilateral in a high percentage of cases, 36.5 per cent in the solid group and 40.3 per cent in the cystic group. Yet the surgeons of our hospital removed both ovaries in but 54.3 per cent of the solid tumors and 47.1 per cent of the cystic ones. It should now be clear to all that if a malignant tumor of the ovary is found at operation both ovaries and the entire uterus should be removed if possible. Yet it is still of further interest to note that in spite of the large number of ovaries left behind no tumors occurred in the remaining ovary in the solid type and in only 4.1 per cent in the cystic type. It is difficult to put these facts together properly, but it is the writer's sincere belief that both ovaries should be removed if a malignant tumor is suspected. The results of bilateral and unilateral oophorectomies do not offer any great amount of difference in the survival rate, for although in the solid tumors the survival rate is twice that of the single removal, in the cystic group more patients are living who had but one ovary removed than of those who had two. This may be all due to the extent of disease and a more perfect detailed analysis might bring out more facts. The presence of adhesions in the solid tumors is a very serious matter, with only 3.2 per cent living, about one-half of the survival rate; while in the cystic groups slightly more than the survival rate of 22.2 per cent are living.

Bilateral Tumors.—In this series the survival rate of patients with bilateral solid tumors is below that of the entire group, while in the cystic group it is better, 25.4 per cent. But dividing the cystic tumors into their two types, the more malignant tumors of the ovary fared worse than the less malignant ones; a 12.3 per cent survival of malignant papillary cystadenoma with adenocarcinoma is distinctly below the average. It would seem from this study that bilateral tumors are more dangerous to the patient than unilateral tumors.

Rupture of Cysts.—The rupture of cysts before or during operation was not serious so far as end results were concerned. It is interesting that in this series of cases when cyst fluid was spilled into the abdomen for any reason, such as tapping because of large size, accidental rupture, and so on, results were better than the survival rate of the whole group. In the solid tumors, 7.6 per cent were living against 6.3 per cent, and in the cystic group 34.7 per cent as against 22.2 per cent. These facts are certainly hard to explain and yet the writer feels that everything should be done to avoid spilling cyst contents unless it can be shown that there is something protective about the fluid. The spilling of small pieces of tumor into the abdominal cavity seems dangerous, but the figures of this group do not support this theory. Is it possible that the fluid in these cysts, probably a secretion

from malignant cells, is in itself an inhibitor of cancer growth?

POSTOPERATIVE MORTALITY

The postoperative mortality was surprisingly low. Realizing that a large group of these patients was inoperable and realizing that many were operated upon and desperate attempts made to remove the pelvic organs, it is surprising to find a mortality of only 11 per cent in the solid group and of but 4.1 per cent in the cystic group. The figures showing the rate of death following operation are of interest, as 71.4 per cent of the solid group died within one year, 38.8 per cent of the more malignant of the two cystic groups, and 26.7 per cent of the less malignant of the cystic groups. These figures point to the very serious consideration that must be given to solid tumors of the ovary of epithelial type.

Table 6

	Solid Carcinoma	Malig. Pap. Cyst with Adenocarcinoma	Malig. Pap. Cyst	Malig. Pap. Cyst plus Adenocarcinoma and Malig. Pap. Cyst
Total No. Cases	63	36	36	72
Postoperative mortality, per cent	11	2.7	5.5	4.1
Died within 1 year, per cent	71.4	38.8	26.7	33.3

RESULTS

There is considerable difference between the five-year end results of the solid group of 63 cases and the cystic group of 72 cases. In the former only 6.3 per cent are living after five years, while in the latter in both types 22.2 per cent are alive and well.

The end results of all types of treatment in the three different types of tumors and in the histologically different classes of tumors are shown in the accompanying tables and only a few of the most striking figures will be commented upon. None of the three patients with solid pseudomucinous tumors is alive at the end of five years. This group constitutes the worst one, but there are too few cases to be of any significance except that this tumor should be considered as having serious malignant possibilities. The best results were among the pseudomucinous papillary cystadenoma group, there being 50 per cent of eight cases alive and well after five years. The next best group is that of the unclassified types of malignant papillary cystadenoma. It was suspected that the unclassified group would show less response to treatment, but in this particular group of cases 35.7 per cent have lived five years. The endometrial type of tumor showed the most discouraging end results in two of three types of tumors, both malignant cystic types. As mentioned above it is well known that once cancer of the endometrium has metastasized it is one of the most malignant of all tumors, being considerably worse than carcinoma of the cervix, for instance. Thus it is understandable to find that this tumor is responsible for the most consistently bad end results. The five-year-plus salvage of malignant cysts is just about the same per cent of salvage as in all kinds of malignant lesions coming for treatment, for example: cancer of the cervix, the body, the breast, the thyroid, and so on. The very poor end results of the solid carcinoma classes this tumor with the very worst of malignant tumors, for instance, the stomach.

ROENTGEN TREATMENT

There is no doubt that treatment by means of radiation following surgery is valuable; but it has been the experience of the author that, although this type of treatment may slow or retard growth, it does not cure these tumors. Perhaps with the coming of the 500,000 and 1,000,000 volt machines a new type of treatment will arise with results that will be of great value. At the present time life is prolonged, but subsequent death is not prevented. X-ray treatment should be used in cases that have peritoneal extension, whenever cyst fluid has been spilled, when a complete operation cannot be done, and in all cases where there is any question as to the perfection of the surgery. If a clean and complete excision has been done radiation should not be used, but should be withheld so that it can be used later if necessary. The statistics and the results of x-ray treatment in the various types of tumors discussed are presented below.

The end results of cases of cancer of the ovary following radiation after surgical removal are not well known and, although our group is not a large one, it is well followed and studied and the treatment was the best that could be given at that time in the Massachusetts General Hos-

pital. Most of the cases were treated with a 200 kilovolt machine with the usual screening, amperage, and so on. The actual treatment has varied from time to time as it has in other clinics. It is fair to assume that these patients were adequately treated as far as treatment was possible. Undoubtedly better results have been obtained from those treated in the past five years, but it is of no use to report on those at this time. To go into complete details of radiation treatment, which probably should be done, would necessitate using up all the time available for this paper. The gross figures of the results obtained by radiation in about 40 per cent of all the cases of cancer of the ovary reported will be seen in *Table 7*. An important figure is that of the radiated group of solid cancers with 7.1 per cent living five years without disease. This is slightly better than the percentage of cures for that group, but must be contrasted with a salvage of 8.5 per cent in a similar group not radiated. There is very little to choose between the two. In the malignant papillary cystadenoma group the radiated cases did considerably better than the non-radiated ones, but in the group with adenocarcinoma in the walls of the cyst the non-radiated cases did better than the radiated. However, there is not much to choose between a 24.5 per cent salvage of radiated cases in the combined group and a 21.4 per cent salvage of non-radiated cases. The groups were fairly comparable, there being inoperable cases in both groups and there being cases that died six to fifteen years later of cancer. It is apparent from this study, as far as it goes, that no more people are cured with radiation than without radiation. Up to the present time the greatest reliance should be placed on surgery. It is more hopeful, however, to view the length of life in months of these patients having radiation as compared to those not having it and here it is clear that in the most malignant type, the solid tumors, radiation prolonged life, but in the cystic groups life was longer without it. The whole study shows that the treatment as given at the time of this study was not of too great value for many. It is the essayist's feeling, however, that much better results will be forthcoming and that perhaps even further analysis of this particular group with due consideration to the extent of disease, the amount and the type of radiation might show that radiation of ovarian cancer was of value. But without picking and choosing cases this type of therapy has not proven so valuable as we thought it would.

Table 7

RADIATION

	Solid Carcinoma	Malig. Pap. Cyst with Adenocarcinoma	Malig. Pap. Cyst	Malig. Pap. Cyst plus Adenocarcinoma and Malig. Pap. Cyst
Total No. Cases	63	36	36	72
Radiation, per cent	44.4	44.4	36.1	40.3
Living 5 yrs. plus without disease, per cent	†7.1	*18.2	†30.7	†24.5
No radiation, per cent	55.5	55.5	63.8	59.7
Living 5 years plus without disease, per cent	†8.5	†25	*17.3	*21.4
Months between operation and death				
Radiation	28	27.6	37.5	32.6
No radiation	16.7	34.5	47.5	32.9

*Worse than percentage living for group.
†Better than percentage living for group.

DISCUSSION

Cancer of the ovary, whether of the malignant cyst type or of the solid type, is a very malignant lesion and deserves more consideration than it has had in the past. The record of the Massachusetts General Hospital is not a brilliant one, but it is likely that it represents the results of the community at large. If this is so and the total percentage of curability is only 14.8 per cent, then more propaganda for early treatment should be started. This tumor ranks with carcinoma of the stomach as one of the most serious of all cancers, for no one can say that the breast, cervix, intestine and rectum do not give better results.

The lesion itself, if found early, should be curable in many cases. It is our problem to try to find a way by which the diagnosis can be made earlier. Perhaps more careful histories, more heed to abnormal menstrual symptoms, and painstaking pelvic or rectal examination of all women is the way to attack the problem. Exploration of the pelvis through the peritoneoscope is another method of attack. Our results will not be better until we are able to diagnose the cases earlier, and if the methods of surgery at the Massachusetts General Hospital are typical of those throughout the country, then we must all change and insist upon more radical surgery in every case. The preservation of an ovary may sound good to the patient, but it may be a very serious thing for her in the

end. Tapping of cysts may make the incision smaller and the operation easier, but it seems reasonable that the removal of the papillary or partially solid tumor *in toto* should prove more valuable in the end. The tapping of the abdomen to prevent the escape of fluid, though easier for the surgeon, and perhaps the patient, runs the chance of spreading disease and puncturing the cyst itself.

The use of the urine or blood tests for estrin and prolan may be of some help in the diagnosis of some of the early tumors, and any abnormal estrin finding or any negative prolan test after the menopause should be considered as indication for pelvic investigation. The use of x-ray should be reserved for those cases in which it has been impossible to do perfect work. To feel any reliance upon it as a method of clearing up a poorly done operation is very undesirable.

Effort should be directed, then, to more careful pelvic examinations, more careful explorations of the pelvis, more reliance on the symptoms presented by the patient, and more expert and radical operative surgery.

CONCLUSIONS

(1) Cancer of the ovary of the solid type is a very serious neoplasm.

(2) Cancer of the ovary of the malignant papillary cystadenoma type is about as malignant as most other epithelial growths.

(3) Early diagnosis and methods for early diagnosis are necessary to improve the end results of this easily operated upon tumor.

(4) The use of the peritoneoscope should be of great value in the diagnosis.

(5) Estrin, pituitary prolan A, and prolan A and B (urinary) determinations should be carried out in suspected cases.

(6) Bilateral tumors are more serious than unilateral.

(7) Bilateral oophorectomy with total hysterectomy is the operation to be carried out if possible.

(8) Postoperative mortality is low.

(9) The rupture of cysts before and during operation and the use of the trocar cannot be proven dangerous by our end results, but nevertheless avoidance of spilling of cyst contents is advocated.

(10) X-ray treatment to date has not proven to be of much curative value, but more modern methods of treatment may give greater success.

(11) Every cystic or solid tumor of the ovary that is removed should be opened before the surgeon feels his operation is ended, to rule out the presence of any suspicious papillary area.

DISCUSSION (*Abstract*)

Dr. Curtis F. Burnam, Baltimore, Md.—My opinions in regard to the treatment of malignant tumors of the ovary, in general, coincide with those of Dr. Meigs. We have not had brilliant operative results. This is due, doubtless, to the fact that most of the patients come for treatment only after the disease is well advanced. Certainly today no one can disagree with the opinion that surgery is the primary method of treating these growths. Whenever an ovarian tumor is suspected, as a result of an examination, an exploratory laparotomy should be done, and if a malignant tumor is found, a radical pan-hysterectomy, with removal of the ovaries and tubes, should be carried out promptly.

Dr. Meigs' histological and pathological classification of tumors seems a very sound one. I was interested in his statement that tumors originally diagnosed as cancers had been later diagnosed as non-malignant, and that some tumors diagnosed as non-malignant growths had later been diagnosed as cancers, on the basis of the histological pictures and subsequent clinical developments. As he has stated, there is a great variety of tumors which occur in the ovary and there are great variations in architecture. While it is often possible to make a positive diagnosis of malignancy, or the reverse, I think it is extremely hazardous, in an operable case, to attempt to give a definite prognosis as to the outcome. It is also extremely difficult, from the histological appearance, to gather any definite information as to the ray sensitivity. I bring this up because there is a widespread tendency to expect pathologists to look at tissue and to tell what is going to happen to the patient, and particularly to tell whether or not ray treatment is indicated. I believe this is impossible.

Our experiences in Baltimore with the radiation of malignant tumors of the ovary have not been altogether unsatisfactory. In passing, I might say that it does not seem likely that the improvement in treating by this method will result from treating with shorter wave lengths, such as those afforded by a million or more volts, although this, of course, is a matter to be decided by trial and observation.

We have had a small series of ovarian cancers, some of which are reported in Curtis' "Gynecology," in which malignant tumors of the ovary have disappeared completely after radiation, and not only disappeared, but the patients have continued in good health. It would seem, in view of this experience in radiating recurrent and inoperable ovarian cancers, that thorough postoperative radiation should be a routine procedure in those cases of cancer of the ovary where a radical and complete operation apparently has been carried out. Certainly if such radiation is limited to the pelvis, it can be done without any deleterious effects on the blood and general condition of the patient, and would seem to be a perfectly harmless procedure.

I am unprepared to say whether the five-year results

from operation and radiation are superior to those of operation alone, but I strongly suspect that this will prove to be the case when enough material is available to be of real value in this connection.

Dr. Meigs (closing).—We have much to learn about the diagnosis and treatment of cancer of the ovary. Occasionally roentgen treatment will improve the condition of a patient and occasionally one will be cured, but by and large no reliance should be placed upon it and surgical removal should be made as complete as possible. I feel with Dr. Burnam that the higher powered machines will make no difference and that future series will show about the same number of successes.

HISTOGENESIS OF SOME OF THE MORE COMMON TYPES OF SARCOMA*

By GEO. T. CALDWELL, M.D.
Dallas, Texas

The development of modified tissue cells from the undifferentiated cells of the germ layers is known as histogenesis. During histogenesis the structure and form of the tissue cells are adapted to the performance of some special function or functions. According to the teachings of embryology,[1] cells which have once taken on the structure or functions of a given tissue cannot give rise to cells of any other type. Evidence has gradually been developing that similar criteria can be applied with considerable certainty to both benign and malignant neoplasms.

Many of the epithelial tumors offered no great difficulty to the ready recognition of the type of cell reproduced in the tumor, although on a morphological basis alone, the origins of some of these remained obscure. Only when their true relationship to normal body cells was revealed by their functional activity has the histogenesis of these tumors been made apparent. In fact, some neoplasms like the "granulosa-cell tumors" of the ovary became understandable only after recognized functional disturbances of a systemic type revealed their identity to their cells of origin, while others, like the basal cell carcinomas of the skin, are still frequently misinterpreted, because they are viewed from the uncritical morphological viewpoint in which cell shape serves as a fallacious guide.

The sarcomas, in general, have offered a far more formidable series of problems in their histogenetic study, and even today classifications based predominantly on cell shape have not been replaced in many of the readily available treatises on neoplasms. Such classifications of sarcomas still include round-cell, mixed-cell and spindle-cell types, terms which, too apparent to be denied, provoke no understanding response and stimulate no new inquiry.

Although Cohnheim's conception of the origin of tumors from misplaced cell masses or "rests" cannot be cast aside completely, it has become apparent that it has only a very limited applicability in the form in which it was originally expressed. The fact that by the use of cancerigenic agents tumors may be produced in susceptible animals, in any selected location, indicates that the cells from which the tumors come are widely distributed and must be related to growth processes or regeneration rather than to any accidental misplacement in embryonic development. Evidently, tumor growth holds intimate relationships with the normal growth processes and regeneration mechanisms. This conception, which is now the commonly accepted one, makes it possible to utilize all of the knowledge of embryology, histology and physiology in the interpretation of neoplasms instead of relying solely upon the morphological appearance of the tumor cells.

This conception, ably applied to the tumors of the glioma group by Bailey and Cushing,[2] has simplified and clarified this puzzling group of varied tumors. These authors state in an unqualified fashion that the histogenesis of the brain furnishes the indispensable background for an understanding of its tumors. They accept as a working hypothesis the presence in the developing encephalon of great numbers of migrating undifferentiated cells which divide actively and may later differentiate into neuroblasts or spongioblasts, or remain fixed in their undifferentiated stage of development. In the large group of brain tumors studied, it was possible to identify practically every cell type described in the section which deals with the histogenesis of the brain.

Geschickter and his various co-workers have most impressively applied this same method of approach to various types of tumors, including many of the more frequently encountered sarcomas. They have utilized the enlarged conception of embryology expressed by Arey[3] in his *Developmental Anatomy* to the effect that the formative history of the individual is not completed *in utero*, but that development continues

*Chairman's Address, Section on Pathology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

through the years of infancy and childhood, and well into adult life. Only at the age of 25 years are the progressive changes in the body complete, and even after that period certain cells retain their primitive embryonic characters; in fact, throughout life many tissue cells undergo retrogressive changes and are continually being destroyed, being constantly replaced, at least in part, by cells of the same type. These regenerative processes would not be expected to occur uniformly throughout the body, but to be concentrated largely in regions of stress and strain, and they would be accentuated by complicated development and affected markedly by functional stimuli.

The histogenetic study of bone tumors by Geschickter[4] and Geschickter and Copeland[5] marks a new epoch in the understanding of osteogenic sarcomas. They point out that the development of the human skeleton is never complete, and at all ages there are places where transitional forms between the different tissues persist, each transition representing a possibility for tumor formation. They assert anew the general rule that tumors repeat to a fair degree the design and physiology of the parent tissue, and this suggests that the tumor in its development repeats the normal histogenesis of the part affected. In regard to the osteogenic sarcomas, an analysis of the underlying tumor processes in relation to the embryology of bone reveals that the normal order of osteogenesis is essentially adhered to. Osteogenic sarcomas are divided into two major divisions corresponding in a general way to the two fundamental types of osteogenesis: the intracartilaginous and the membranous.

The first main division of osteogenic sarcomas reproduces the various stages of intracartilaginous bone formation. The less differentiated forms of these arise from a precartilaginous connective tissue, resembling in its behavior the primitive connective tissue at the site of the future skeleton. The more differentiated forms of cartilage-containing sarcomas arise from tissue that has already differentiated into cartilage and has its source in the proliferation of chondroblasts. Sarcomas reproducing this type of osteogenesis consist of myxomatous fibrous tissue and cartilage, singly or combined, and some regions may differentiate into bone. This accounts for the myxosarcomas, the chondromyxosarcomas and the chondrosarcomas of bone. Geschickter has pointed out that many of these chondrosarcomas arise periosteally without involving primarily the cortex or the medullary cavity. These primary periosteal chondrosarcomas are not derived from cartilage or misplaced tissue at the epiphyseal line, but are apparently associated with precartilaginous connective tissue which persists normally at points of tendinous attachment to bone. Naturally, a group of chondrosarcomas arises at the epiphyseal lines, chiefly about the large joints of the extremities, taking origin before the closure of the epiphyseal lines. It has been emphasized that there is no marked tendency to tumor formation in the early embryonic cartilage and bone development, but where the histogenetic processes, in and about bones, are more complicated and delayed until later life, the tendency to neoplastic growth occurs, especially at the margins of joint capsules, at points of attachment of tendons and ligaments and at sites of formation of normal bony protuberances for the insertion of important tendons. In the Johns Hopkins series, approximately one-half of all primary neoplasms of bone are related to intracartilaginous ossification.

The second main division of osteogenic sarcomas reproduces the various stages of membranous bone formation. It is not surprising to note that this group of tumors does not usually form cartilage, since the type of bone formation represented occurs directly from the fibrous tissues of the periosteum. In spite of the fact that the long bones grow in length chiefly by intracartilaginous ossification, membranous bone is laid down by the periosteum to form the cortex of such bones, as well as of the flat bones which are membranous throughout. The osteogenic sarcomas reproducing this type of periosteal bone formation arise in the deeper layers of the periosteum from cells which are capable of being transformed directly into osteoblasts. Histologically, these tumors reproduce the various stages in the transformation of fibrous connective tissue through poorly differentiated spindle cell stages to definite osteoblasts and then to osteoid tissue, and finally, in many cases, true bone formation. Many of these tumors consist chiefly of osteoblasts, but usually in some portion of the tumor, osteoid tissue or definite bone spicules are formed. In its most typical form, bone spicules radiate throughout the tumor mass. These tumors are metaphyseal in location and subperiosteal in position. They occur chiefly within the age limits of 15 to 25 years and seem to be related to the

rapid bone formation in this region during the normal growth period.

Since cancellous bone formation remains a possibility throughout life, the occurrence of a few centrally placed and essentially osteolytic sarcomas may be related to this process. They might be expected to have a wide age distribution and vary considerably in the region of bone involved. Geschickter has attempted to relate the malignant bone aneurysms and some of the metastasizing giant-cell sarcomas of bone to this function of cancellous bone formation, explaining that a more primitive type of ossification occurs in the endosteum, and that the giant cells are associated with the resorption of calcified cartilage. If such histogenesis can be established for this small group of osteolytic sarcomas, it is of great theoretical interest in connection with this developmental interpretation of osteogenic sarcomas, and the relation of the giant cells to the osteolytic process might give some hint of their connection with the so-called benign giant-cell tumors. An entirely satisfactory embryological interpretation of the relationship of benign giant-cell tumors to the normal histogenesis of bone may still be wanting. However, Geschickter and Copeland[6] have presented a tenable hypothesis which relates these tumors to the resorption of calcified cartilage or temporary bone, and have apparently established the fact that they occur only where intracartilaginous bone is being formed. The bone destructive character of these lesions, and the prevalence of giant cells, or osteoclasts in them, indicates that the benign giant-cell tumor is the result of an abnormal hyperplasia of osteoclasts, related to a normal osteoclastic proliferation occurring as one phase in the histogenesis of intracartilaginous bone. Apparently, there are as yet no well-established exceptions to the observation that benign giant-cell tumors of bone arise only in areas of intracartilaginous bone formation.

Likewise, the suggestion that the benign giant-cell tumors of tendon sheath type are related to a similar osteoclastic process in the sesamoid bones of the regions involved possesses the merit of stimulating a renewed interest in these peculiar tumors. Also, the correlation of the tumors of epulis type with the process of odontoclasia, concerned with the shedding of the deciduous teeth, furnishes, at least, a tentative embryologic basis which must be considered in any attempt to establish the histogenesis of this group of tumor-like processes.

Considerable doubt prevails, at present, concerning the histogenesis of the Ewing sarcoma. Apparently a variety of different tumors have been included in this group. Connor[7] has recently stated that among the cases reported by him in 1926 as Ewing tumors there were a number which were undoubtedly multiple myeloma or lymphosarcomatosis with metastases to bone. Other observers[5] have reported tumors of the neuroblastoma type which gave rise to bone metastases, simulating the Ewing tumor of bone, and even certain small-celled carcinomas have been mistaken for Ewing sarcomas.[9] Additional data, obtained from autopsied cases, should readily remove the uncertainty of bone metastases, although there may still remain some difficulty in differentiating this tumor from others of marrow origin and of establishing its exact histogenesis.

It seems, therefore, that among the malignant tumors of mesenchymal origin the osteogenic sarcomas reveal most clearly their embryologic and functional relationships. The various stages of differentiation in osteogenesis present quite distinctive histologic appearances. Much greater difficulty is experienced with the fibrosarcomas whose cells of origin develop by a more direct differentiation from the cells of the mesenchyme. These mesenchymal cells have irregular bodies which may possess quite long processes and the cells are typically suspended in a relatively large volume of tissue fluid. Fibroblasts are descendants of the primitive mesenchymal cells from which it is often difficult or impossible to distinguish them. In fact, Cowdry[10] states that some of the primitive mesenchymal cells may even persist in the fibrous connective tissue, for there is no possible way to differentiate them from fibroblasts.

In spite of the widespread distribution of fibrous connective tissue throughout the body and its active participation in repair processes, it is a well recognized fact that malignant tumors develop relatively infrequently in fibrous connective tissue. Geschickter and Lewis[11] attribute the rarity of these tumors to the simple and direct formation of adult fibrous tissue from mesenchyme, and intimate that this simplicity

of differentiation in a tissue which retains its power of regeneration supplies very few "embryonic rests."

These malignant tumors derived from the fibrous connective tissue are now usually classed as fibrosarcomas. The less differentiated of the fibrosarcomas are composed of closely packed spindle cells with relatively little apparent intercellular substance. These tumors are highly malignant and for the most part occur in young individuals. They constitute the main remaining remnant of the spindle-cell sarcomas of the old terminology. The more fully differentiated fibrosarcomas are characterized by the formation of a fibrous intercellular substance, by a slower rate of growth, and by a greater tendency to occur in a later age period. No very satisfactory terms have been suggested as yet for these main subdivisions of the fibrosarcomas, although they are often designated the spindle-cell and fibrous types of fibrosarcomas. It is of interest to note that no provision is made for round cell sarcomas among the tumors derived from the fibrous connective tissues.

A small but important group of fibrosarcomas arises in the fibrous tissue of the breast, constituting from 1 to 3 per cent of all malignant tumors of the breast. Fox[12] has shown that from each of the supporting structures of the breast, tumors of definite character and location may develop. The interlobar connective tissue which is continuous with the pectoral fascia may give rise to fibrosarcomas similar to those arising from fascias elsewhere in the body. Those sarcomas arising from interlobular fibrous tissue or from pre-existing fibro-adenomas of the breast are often characterized by the persistence or even by the proliferation of the epithelium derived from the lobules of the breast, giving rise to the infrequent adenosarcomas or the even rarer carcino-sarcomas of the breast. The intimation is that the fibrous tissues which are most closely associated with the lobules of the breast retain some of their functional adaptations in the sarcomas which develop from them, giving distinguishing features which serve to separate them from the more frequent fascial fibrosarcomas.

The relationship of many of the fibrous tumors of the skin, the subcutaneous tissues, and certain of the intermuscular tissues of the extremities and of the chest wall to nerves and nerve endings has long been suspected. Robert W. Smith,[13] of Oxford, in 1849 described two cases of neurofibromatosis and noted that the fibers were arranged in bands or loops, although no trace of the nerve tubes could be seen in the sections of the tumors. Von Recklinghausen many years later recognized that these tumors arose from the sheaths of the cutaneous nerves and this observation later met with universal acceptance. Other tumors, occurring singly, are not infrequently found attached to nerves, or, on histologic study are seen to possess features which relate them to nerve sheaths or to nerve endings. The histogenesis of these groups of benign tumors has been most carefully studied in order to determine the elements of the nerve sheaths which proliferate to form the tumor masses.

The peripheral nerves are described[14] as possessing three sheaths of very different anatomical and physiological significance: (1) the myelin sheath; (2) the sheath of Schwann; and (3) the connective tissue sheath, which includes two distinct systems, an endoneurium and a perineurium. This connective tissue sheath is a product of the mesenchyme, while the sheath of Schwann is thought to be of neuro-ectodermal origin. Evidently, it is fairly well established that most of the tumors which form in von Recklinghausen's disease are of connective tissue origin, justifying the name neurofibromatosis for the fully developed syndrome. However, a few of these tumors and most of the singly occurring tumors associated with peripheral nerves possess certain features which suggest an origin from the cells of the sheath of Schwann, as noted by Verocay as early as 1908. Stout[15] has recently renamed this specific nerve sheath tumor, suggesting the term neurilemmoma as more accurate, or, at least, less objectionable than any previously applied. He makes it clear that other tumors may be associated with peripheral nerves and their sheaths, such as (1) pure fibromas, (2) the neurofibromas of von Recklinghausen's disease and (3) the various malignant tumors. All authorities agree that this specific tumor is composed of highly differentiated tissue and that it is a nerve sheath tumor, although its cell origin and its exact relationship to the malignant tumors of nerve sheath type are not so com-

pletely established. Tumors of the neurilemmoma type are sometimes found in cases of von Recklinghausen's disease, and among the fifty cases of solitary nerve sheath tumors recently reported by Stout, 18 per cent of the patients revealed some of the stigmata of von Recklinghausen's disease. Ewing[16] as early as 1922 expressed the belief that the great majority of fibromas and fibrosarcomas of the skin and deeper tissues of the limbs and trunk are of neurogenic origin. Five years later, under his inspiration, Quick and Cutler[17] described a group of fibrous tumors as neurogenic sarcomas and pointed out that they occur most frequently in the subcutaneous or deeper tissues of the arm, leg, popliteal space, and chest wall. These tumors were previously designated as fibrosarcomas, spindle-cell sarcomas, or fascial sarcomas, but, on more careful examination, they seem to possess clinical and structural differences which separate them from the group of fibrosarcomas.

Reviews[18] of the reported cases of von Recklinghausen's disease have revealed a definite tendency of these neurofibromas to undergo malignant degeneration. Sarcomas developed in 13 per cent of these cases, and involved most frequently deeper nerve trunks.

It is assumed that the malignant neurogenic tumors are derived from the same specialized tissues of the nerve sheaths which give origin to the benign neurilemmomas, and probably also to the neurofibromas. The tumor cells retain the tendency to undergo a partial differentiation into the functional structures of the normal tissues which they represent. Some of the tumors may reproduce the unmodified fibrous tissue of the fibrosarcomas, but the great majority r e t a i n differentiating characteristics whereby their nerve sheath origin may be recognized. These so-called neurogenic sarcomas vary markedly in the fidelity with which they reproduce adult nerve derivatives, and the variations in their malignancy roughly parallel the degree of differentiation of the cellular constituents of the tumor.

A close histogenetic relationship between neurogenic sarcomas and certain of the malignant melanomas is indicated by many recent studies.[19] Masson has apparently established the relationship of nevus cells and, at least, some of the melanomas, to sensory nerve endings. A few intermediate types occur in which the features of melanomas are fused with those of neurogenic sarcomas. Ultimately the histogenesis of these two related groups of tumors will be established and the varied forms which they assume will be readily comprehended. Perhaps some aid will be obtained by means of experimentally produced tumors. Of great significance is the fact[20] that various types of mesenchymal tumors can be produced at will by readily available cancerigenic agents, such as 1:2:5:6 dibenzanthracene. This new method should furnish the succession of early stages which render the distinguishing features of the various types of sarcoma more readily recognized.

The histogenetic approach to the study of neoplasms has revealed a close parallelism between the varied tumor structures and the stages of functional differentiation in the tissues from which they are derived. The malignant mesenchymal tumors yield to this embryologic interpretation almost as effectively as do the carcinomas and the tumors of the glioma group. A new lease on life is given to embryology, and growth processes and regeneration assume a new meaning.

BIBLIOGRAPHY

1. Arey, L. B.: Developmental Anatomy. Philadelphia: W. B. Saunders, 1926.
2. Bailey, P.; and Cushing, H.: A Classification of the Tumors of the Glioma Group on a Histogenetic Basis, copyright 1926.
3. Arey, L. B.: Developmental Anatomy, p. 1. Philadelphia: W. B. Saunders, 1924.
4. Geschickter, Chas. F.: Arch. Surg., **24**:602-659, and **24**: 798-867, 1932.
5. Geschickter, Chas. F.; and Copeland, Murray M.: Tumors of Bone. Amer. Jour. Cancer, 1931.
6. Geschickter, Chas. F.; and Copeland, Murray M.: Tumors of Bone. Ibid, p. 302.
7. Conner, Charles L.: Amer. Jour. Cancer, **22**:41-51, 1934.
8. Colville, H. C.; and Willis, R. A.: Amer. Jour. Path., **9**: 421-429, 1933.
9. Hirsch, E. F.; and Ryerson, E. W.: Arch. Surg., **16**:1-30, 1928.
10. Cowdry, E. V.: Text-book of Histology, p. 374. Lea & Febiger, 1934.
11. Geschickter, Chas. F.; and Lewis, Dean: Amer. Jour. Cancer, **25**:630-655, 1935.
12. Fox, Saul Laurie: Ann. Surg., **100**:401-421, 1934.
13. Quoted from Fulton, John F.: New Eng. Jour. Med., **200**: 1315-1319, 1929.
14. Nageotte, J.: Penfield's Cytology and Cellular Pathology of the Nervous System, p. 191. New York: Paul B. Hoeber, 1932.
15. Stout, Arthur Purdy: Amer. Jour. Cancer, **24**:751-796, 1935.
16. Ewing, J.: Neoplastic Diseases, 2nd Ed., p. 153. Philadelphia: W. B. Saunders Co., 1922.
17. Quick, Douglas; and Cutler, Max: Ann. Surg., **86**:810-829, 1927.
18. Hosoi, Kiyoshi: Arch. Surg., **22**:258-281, 1931.
19. Stewart, Fred W.; and Copeland, M. M.: Amer. Jour. Cancer, **15**:1235-1320, 1931.
20. Haagensen, Cushman D.; and Krehbiel, Otto F.: Amer. Jour. Cancer, **26**:368-377, 1936.

THE CULTIVATION OF *HEMOPHILUS DUCREYI* AND PREPARATION OF AN ANTIGEN FOR INTRACUTANEOUS DIAGNOSIS OF CHANCROIDAL INFECTION*

By EVERETT S. SANDERSON, PH.D., M.D.
and
ROBERT B. GREENBLATT, B.A., M.D., C.M.
Augusta, Georgia

The presence of several types of venereal disease, and the recognition of multiple infections in the same individual, has led to various laboratory procedures which may serve as an aid to more accurate diagnosis. Heretofore, the diagnosis of chancroidal infection has been based on clinical grounds, due in part, at least, to the fact that the bacillus of Ducrey is notoriously difficult of cultivation. The introduction of sterilized bubo pus by Frei[1] for intracutaneous injection is now recognized as a valuable aid in the recognition of lymphogranuloma inguinale. Using a similar technic, Cole and Levin[2] have advocated an intracutaneous test as a means of diagnosing chancroidal infection.

One of us (R.B.G.), of the University of Georgia Hospital Clinic, has been interested for some time in the newer venereal diseases as encountered in clinic patients, and on the basis of the investigations of Cole and Levin prepared pus antigens for investigative purposes. Such antigens were observed to be valuable, but one of the chief drawbacks was the lack of sufficient bubo material for carrying on a large series of tests. Particularly was this true when it was observed that quite a number of patients reacting to chancroidal pus also gave a positive Frei action, indicating both infections. It was believed, therefore, that more satisfactory and reliable results would be obtained were it possible to use as antigen a suspension of Ducrey bacilli. Such an antigen is used in England and the Continent, but it is not available in the United States. Also, except for the strains isolated by Hunt[3] in St. Louis, none were to be had in this country so far as the writer is aware. It was decided therefore to devise a method, if possible, for cultivating our own organisms from which an antigen could be made. A reasonable degree of success has been met, although no attempt has been made to make cultures from all cases. Thus far, ten strains have been recovered from bubo pus, seven of which were in pure culture.

Method of Culture.—The method employed is not new in bateriological technic, and as yet there are insufficient data at hand to be able to state that it is the "best" one. But since it has given success in our hands it will be described. Soft beef infusion agar (0.5 per cent agar) is put up in aluminum screw cap vials in 5 c. c. amounts and sterilized. When ready for use, 1 c. c. of human defibrinated blood is added per vial. Bubo pus is aspirated under strictly aseptic conditions to prevent admixture of skin contaminants, and not more than 0.2 c. c. added to a vial. Incubation is at 37° C. Growth in filaments or chains of bacilli usually occurs in 48 hours, although we never discard cultures as negative within a week. Sometimes in initial cultures the bacilli are to be found in masses of tangled clumps, and it may take careful search to locate them. Once grown, we find it necessary to transplant cultures at 3 to 4 day intervals to retain viability, using 0.1 c. c. as inoculum. It is stated that death is rapid in the ice box. We are now trying actual freezing of the cultures, but no data are available yet.

Preparation of Bacterial Suspension.—We have had poor success with growing the organisms on the surface of any medium tried, aerobically or anaerobically, in amounts sufficient to be used for suspension. So the following procedure has been resorted to: to tubes of beef infusion agar in slants is added onto the slant, 1 c. c. of human defibrinated blood. The blood is inoculated with 0.1 c. c. from an actively growing culture and placed under partial oxygen tension as advocated by Hunt, of St. Louis. To obtain this environment, the cotton plug is cut off short and pushed slightly into the tube, the upper portion of the tube heated, but not too much, in a Bunsen flame and the tube sealed by inserting a tightly fitting rubber stopper. Incubation is for 2 to 3 days at 37° C. During this period there is good growth in the fluid blood, and to a lesser extent on the surface of the slant. After the incubation, the blood and surface growth, if any, is removed with a sterile pipette and added to approximately 25 c. c. of sterile distilled water in a sterile centri-

*Read in Section on Pathology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Bacteriology and Public Health and the Department of Pathology, School of Medicine, University of Georgia.

fuge tube of sufficient volume, and contents are sedimented by high speed centrifugalization. The supernatant fluid is removed aseptically and discarded and the process repeated. Two such treatments suffice to remove most of the hemoglobin. The sediment which contains the bacilli and red cell debris is suspended in 10 c. c. of sterile physiological saline and placed in sterile vials. The vials are heated for 30 minutes at 60° C. and the suspension is preserved by the addition of 1-10,000 merthiolate. Following tests for sterility, the antigen is ready for use. One-tenth c. c. is employed for intracutaneous tests, and results are observed after 48 hours.

Results from Intracutaneous Tests.—The intracutaneous tests were done under the supervision of one of us (R.B.G.). In the earlier part of the work, before bacillary suspensions were available, pus antigens were employed. It was noted that when positive the reactions were frequently not pronounced and clear cut, and that sometimes they were negative altogether in some individuals having a negative Frei test with ulcer and bubo, clinically resembling chancroidal infection. Later, reactions were sometimes negative in cases where suspicious organisms were found in direct smears or even isolated in culture. Subsequent data would appear to attribute this discrepancy to the small amount of antigenic substance in bubo pus, for, in the material we have examined, the organisms were found only after careful search, and usually were not seen at all even in the material from which they were obtained on culture. Then, too, the monovalency of pus antigens should not be overlooked entirely. In the light of these discrepancies, although we believed that the theory of the test was sound, we were stimulated to devise a method for cultivating the organisms from which a more concentrated antigen could be prepared. This has been described.

Tests were done on some 175 individuals, of whom 75 were recognized as having chancroidal infection on the basis of clinical observation, history, smears, cultures, skin tests, and the application of other tests such as Wassermann, Frei's, and smears for Donovan's bodies, where indicated. Approximately 60 per cent of the chancroidal infected cases were tested both with pus antigen and bacillary antigen; of the remainder, about 50 per cent received both tests. A total of 168 pus antigen tests were done. Of these, 4 were considered false positive and 36 false negative, yielding a correct diagnosis of about 80 per cent.[4] Two hundred sixty-two bacillary antigen tests were done, 6 of which were considered false positive and 5 false negative, yielding a correct result in about 96 per cent. Among patients on the wards who were presumably normal controls as determined by questioning, and examination for absence of old penile and bubonic scars, neither antigen gave false positive reactions.

SUMMARY

The intracutaneous injection of an antigen prepared from chancroidal bubo pus has shown its usefulness in the recognition of this infection. From a microscopic examination of bubo pus we are inclined to believe that the amount of antigenic substance contained in such material is limited, and the results of our tests would appear to bear out this assumption. Furthermore, the application of this test is limited, owing to the amount of material readily available for the preparation of antigen. To obviate this difficulty, a method has been described for cultivating the hemophilus of Ducrey and the preparation of a "vaccine" from such cultures. The data obtained appear to indicate that such a vaccine gives more satisfactory results than one prepared from pus, and is highly specific. While our vaccines have been largely monovalent, it is felt that polyvalent ones might serve still better.

BIBLIOGRAPHY

1. Frei, Walter: Eine neue Hautreaktion bei Lymphogranuloma. Inguinale. Klin. Wchnschr., **4**:2148, 1925.
2. Cole, H. H.; and Levin, E. A.: The Intradermal Reaction for Chancroids with Chancroidal Bubo Pus. J.A.M.A., **105**: 2040, 1935.
3. Hunt, G. A.: Cultivation of Ducrey Bacillus for Preparation of Vaccine. Proc. Soc. Exper. Biol. & Med., **33**:293, 1935.
4. Greenblatt, R. B.; and Sanderson, E. S.: Chancroidal Vaccine. Amer. Jour. Clin. Path., in press, March, 1937.

DISCUSSION (*Abstract*)

Dr. Frank W. Hachtel, Baltimore, Md.—Ito, in 1913, first made use of a vaccine of the bacillus of Ducrey both for a diagnostic skin test and for treatment by intramuscular injection, of the chancroid and its complications. Though Ito obtained good results with this method of therapy, he was finally lead to abandon its use because of the rather severe local reactions. Nor did the intradermal test attract much attention until Reenstierna in 1923 confirmed the results of Ito. Since then it has been used by many investigators.

Ito found that the reaction becomes positive after the eighth day of infection, while Nicolau and Banciu relate that positive reactions occur between the fourth and fifteenth day of the disease. The percentage of such reactions reported by different observers has varied but in all instances it has been relatively high. Non-specific reactions are rather uncommon. Many of the investigators remark upon the persistence of hypersensitivity after the lesions have healed: for years or even for life. A positive reaction may thus indicate either a current or a former infection but is no reflection of susceptibility to infection. On the other hand, a negative reaction would seem to exclude Ducrey's bacillus as the etiological agent. Some observers, Yu Tun-Pe in particular, have noted a focal, as well as a local, reaction following the intradermal inoculation.

According to some reports, the intensity of the skin reaction serves as an index to the severity of the general reaction which will follow intravenous injection of the specific vaccine. However, it is not clear from the literature to what extent the intensity of the local reaction is affected by the gravity and extensiveness of the lesion, by the existence of a bubo, or by the duration of the infection.

The Ito-Reenstierna test has been used not only for the purpose of diagnosis but also by Teissier et al. as a guide to specific therapy. They recommend that treatment with the vaccine be limited to those showing hypersensitivity. They also advise that the initial dose be determined by the degree of hypersensitiveness as ascertained by the skin test.

The difficulty with which the bacillus of Ducrey can be grown in sufficient quantities for the production of a vaccine is reflected in the number of media that have been tried. Almost every investigator has used a somewhat different formula, although the majority seem to have employed some type of blood agar. It was this difficulty, probably, which lead some investigators to use sterilized pus aspirated from the bubo both for the intracutaneous test and for the treatment of the infection. Annuzi and others have compared the reactions occurring after the intradermal inoculation of pus with those obtained by the use of the vaccine. The results were comparable, though perhaps weaker and more transitory when pus was used as the antigen. One would rather expect such a result since, as Dr. Sanderson states, Ducrey's bacillus is not generally present in large numbers in the bubonic exudate.

As Dr. Sanderson says, Hunt has recently found that this micro-organism grows better in an atmosphere of reduced oxygen tension. The application of this technic to the production of the vaccine would, therefore, seem to be a forward step.

Dr. David T. Smith, Durham, N. C.—I am interested in the nature of the skin tests. The reaction resembles in general a tuberculin test. There is an interval of time between the beginning of the infection and the development of a positive skin test. I should like to ask Dr. Sanderson if he considers the test an indication of hypersensitivity to the protein of the Ducrey bacillus? And if the test indicates hypersensitivity, can the patients be treated by desensitization?

PROPHYLAXIS AND TREATMENT IN THE CONTROL OF SYPHILIS*

By JOSEPH EARLE MOORE, M.D.
Baltimore, Maryland

Unlike many other infectious diseases, syphilis is not preventable by elimination of the contact which causes it, by extermination of an intermediate host, by immunization, or by quarantine. Efforts to control the disease by reducing the number of sexual contacts of human beings have failed; and such efforts should be, moreover, in the hands of the educator, the law enforcement officer, and the minister, not in those of the physician. There is no intermediate host to exterminate; man is the only reservoir of syphilis. Immunization has heretofore failed completely; if it is ever successful, accomplishment must probably wait on solution of the so far unsolved problem of growth of the Treponema on artificial media. Quarantine is unthinkable because of the stigma attaching to the disease, because most infectious patients are not actually ill, and because concentration camps large enough to hold the necessary many thousands of persons for the necessary many months are neither available nor likely to be furnished.

Syphilis is preventable, however, by at least three different methods easily available to physicians. Advantage may be taken of the biological fact that the Treponema dies as soon as it dries, and that infection is therefore usually transmitted by direct contact of moist genital surfaces in sexual intercourse, to prevent that intersurface contact. This is mechanical prophylaxis, best accomplished by means of the condom. Advantage may be taken of the extreme susceptibility of the Treponema to mild antiseptics, to destroy it while it is still on the body surface, before it has penetrated the tissues. This is chemical prophylaxis, best accomplished by means of soap and water and by calomel ointment. Advantage may be taken of the susceptibility of the organism to treponemicidal drugs taken by or administered to the patient even after the virus has penetrated the tissues. This, too new to have been christened, may be

*Read in Section on Public Health, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Syphilis Division of the Medical Clinic, Johns Hopkins Hospital, Baltimore.

called chemotherapeutic prophylaxis, and is best accomplished with bismuth intramuscularly, and possibly also with stovarsol (acetarsone) by mouth or arsphenamine intravenously.

All of these methods are effective in experimental animals, and three of them, mechanical, chemical and chemotherapeutic (with bismuth) prophylaxis, have demonstrated their value in man. Why then has syphilis not been eliminated, or at least decreased, by their use?

Let us first consider chemical prophylaxis, the efficacy of which has been thoroughly demonstrated in the armies and navies of the world, including our own. Two forms of chemical prophylaxis exist, namely: treatment administered by an expert attendant at a prophylactic station, and self-treatment by the sanitube method. The prophylactic station, by far the better of the two, has been a flat failure in civilian life, for reasons succinctly outlined by Warren.[1]

"(1) Inconvenience. People will not travel to a station within [the necessary]* one to three hours after exposure, especially at night.

"(2) Fear of publicity. Exposed persons will take a chance rather than register or be seen at a station by friends, private detectives, or blackmailers.

"(3) Fear of embarrassment. Imagine the meeting of two persons at a prophylactic station after an affectionate parting an hour before.

"(4) Lack of compulsion. There is nothing to compel a civilian to visit a station."

To quote Warren further:

"Under military discipline none of these handicaps applied, for in the army a soldier reached a station when he returned to barracks to sleep. He did not fear embarrassment since half his comrades were there in the course of three months, and above all, the threat of a court martial powerfully augmented his sense of discretion. None of these considerations impel the civilian, hence the civilian stations failed. * * * The newer generation, in and out of the service, has accepted the natural alternative: drug store prophylactics for personal and private use."

According to Warren, some 2,600,000 sanitubes are sold yearly in American drug stores. Though, like station prophylaxis, they provide protection only for men and not for women, and though, owing to lack of governmental supervision, one-third of the tubes sold are said to be worthless and another third unreliable, they probably do some good. Nevertheless, it seems clear that owing to ignorance, laziness or carelessness, syphilis in civilian life can never be controlled by chemical prophylaxis.

What of chemotherapeutic prophylaxis? Though it is clear that syphilis can be prevented in experimental animals with either stovarsol given by mouth or arsphenamine given intravenously, the evidence that the same result can be accomplished in man is uncertain and inconclusive. Infection may be only suppressed, not prevented. Furthermore, both drugs carry a risk of serious reaction which rarely justifies their use for this purpose, and if ever, only after definite exposure to a known infectious syphilitic. The mass application of stovarsol or arsphenamine prophylaxis is obviously out of the question.

Bismuth prophylaxis is also effective in experimental animals, and Sonnenberg[2] has shown that in prostitutes, syphilis may be prevented with a fair degree of certainty by intramuscular injections of bismuth given every two weeks over an indefinite period of time. For the mass prevention of syphilis, however, this method, while applicable to special groups of prostitutes, is manifestly inapplicable for the general population, since it would require that every adolescent or adult who might conceivably be exposed to syphilis be given what is in effect continuous antisyphilitic treatment.

The achievements of the laboratory in chemical or chemotherapeutic prophylaxis, proved in man under special conditions of military or police supervision, fail as mass control measures because of their inconvenience or danger, or because of the failure of human nature itself.

What of mechanical prophylaxis, the condom? This is a device utilizable before and during the act of intercourse, thus avoiding the considerable psychologic hazard of other methods which must be applied after, and soon after, to be effective. It affords actual protection to man and woman from infection not only with syphilis but with other venereal diseases as well; "it is readily obtained, carried and applied; it causes no discomfort or pain; it is entirely harmless and leaves no ill effects; it is economical" (Warren), and in its modern form, does not interfere with sexual pleasure. Weighed against these advantages are the disadvantages that many condoms available on the market are of poor quality, are filled with imperfections and break easily, that infection may occur during removal, and that no protection is afforded against infection of or from other parts of the genitalia than the penis, or from kissing.

Warren states that in this country nearly 400,000,000 condoms are sold annually, "about 1,000,000 every 24 hours," and that production

*Bracketed words mine.

has multiplied almost 10 times in the last 5 years.

Only one state, Oregon, has taken steps to control the quality of condoms sold within its borders. Warren believes that of those available on the open market in New York, only 25 per cent are of good quality, 50 per cent doubtful, and 25 per cent definitely faulty. He points out the necessity for governmental control of standards of manufacture.

Seven states and more than 160 cities have, according to Warren, confined the sale of condoms to physicians and prescription drug stores, and he believes that this regulation should be in force everywhere. It is an arguable point, however, whether the public interest would not be better served by concentrating attention on excellence of manufacture, and not only to permit, but actually to encourage, the sale of condoms by such agencies as bars, cabarets, gas stations, garages, restaurants, road houses, barber shops, pool rooms, cigar stores, bell boys, news stands or even slot machines.

For the mass prophylaxis of syphilis (and of gonorrhea as well) it is generally agreed that the condom, imperfect as it may be, is nevertheless the best solution now available. Public health authorities and the medical profession generally should make every effort to improve the quality of the condoms manufactured, to educate the public to their use, and to facilitate their sale. If every extramarital sexual exposure were protected by this means, the incidence of syphilis would drop sharply and at once.

Valuable as the increasing use of mechanical prophylaxis may be as an adjunct in the control of syphilis, solution of the problem does not lie in that direction. It is not enough to improve the quality of condoms and to facilitate their sale. The delicacy of the sex issues involved is such as to prevent adequate dissemination of information to the lay public concerning mechanical prophylaxis without offering offense to public morals. Even if every man and woman knew of the desirability of the condom as a preventive of infection, there would still be many, far too many, potentially infectious sexual contacts in which its use was deliberately or carelessly omitted.

The means of control of syphilis are, however, at hand. Treatment of the early infectious case is the weapon forged by Schaudinn, Wassermann and Ehrlich, and applied with spectacular success in Scandinavia during the past twenty-five years. If every patient with early syphilis could be brought under adequate treatment and held there for the requisite length of time, our problem would be solved. This sounds easy of accomplishment. Actually, there are many difficulties in the way which must be met.

The first requirement for success is that early syphilis shall be brought under treatment. This is far from achievement as yet. It is currently estimated that only about 50 per cent of patients with early syphilis come under competent medical care during the period of infectiousness. Ignorance on the part of the patient, which keeps him away from the physician because he does not know the significance of his symptoms, must be combated by vigorous and sustained efforts to educate the laity as to what early syphilis is and what it may do. Ignorance on the part of the physician who misses the diagnosis because of inadequate knowledge must be combated by improving the standards of medical education. The patient with trivial lesions, the patient with symptomless infection, must be sought for by epidemiologic methods. Drug store, cultist, and quack treatment of syphilis must be abolished.

Next, there must be available facilities for treatment adequate to meet the demand created by an increased case load, not only of early but also of late syphilis. However desirable it may be to concentrate public health effort on early syphilis, late syphilis cannot be neglected, for individual, humanitarian and economic reasons; and the number of patients with late syphilis applying for medical care may be expected to increase temporarily with organized case finding. The available free and part pay facilities are not adequate for the present case load, let alone for the potential demand. More clinics are urgently needed, both in urban and rural communities. More clinics can be obtained only if local lay interest can be aroused and local funds provided. It is both undesirable and impossible for the Federal Government to provide clinic facilities in the several states; and equally undesirable and impossible for the states themselves to assume the entire burden. Each city, each county, must be made aware of its own problem and its own needs. The public health officer is obviously the one to assume this task; to educate the political officials in charge of the public purse; and, if he finds them uneducable, to go over their heads to the people, to create a demand for action from the public which appropriating bodies will find irresistible.

Not only must there be more clinics, but there must be better clinics. No one familiar with the average health department syphilis clinic can escape the feeling that, so far as the diagnosis and treatment of the individual patient is concerned, these clinics are as a rule very bad indeed. Nothing is known of the patient except that he has syphilis, and whether the syphilis is early or late, primary or paretic, is of no moment to the doctor in charge, whose chief function is the technical administration of "shots." Treatment is over-routinized, in some instances hazardous because of the existence of unrecognized lesions of cardiovascular or neurosyphilis or of associated diseases, and often excessive in amount. A public health officer in another state told me of a patient to whom he had administered weekly treatment for ten years in the futile and unnecessary effort to reduce a fixed positive Wassermann to negative!

Better clinics can be obtained if they are staffed not by political preferment but on the basis of medical competency; if the physicians serving in them are adequately compensated; and if competent consultation service is provided.

Not only must there be more and better clinics, but also more of them must provide wholly free service. The facts that at least 50 per cent of patients infected with syphilis are unable to pay anything for medical care, and that relatively few of the remaining half can finance the complete cost of treatment for syphilis, must be squarely faced. The constant demand for fees from patients, no matter how small, is the greatest single obstacle in the way of keeping patients under treatment for the requisite period of time. Free treatment available for all is generally believed to be the most important factor in the reduction of syphilis almost to the vanishing point in the Scandinavian countries.

The provision of free clinics rests on the same basis as the provision of more clinics, money. Local funds to finance the need must be obtained, and the public health officer is the obvious person to do the obtaining. If he is not interested, no one else will be.

Finally, it must be recognized that even given more clinics, better clinics and free clinics, the control of syphilis by present-day treatment methods is still far from satisfactory. Treatment is too prolonged, too painful, too dangerous, too expensive. Efforts of investigators to develop better and especially shorter methods of treatment should be encouraged. On the other hand, premature publicity for such methods, whether in the medical or lay press (and more particularly in the latter), is to be deplored. The suggestion in the October 31 number of the *Literary Digest* that early syphilis may be cured by one new (and as yet unproved) method in three months, or by another in two weeks, is worse than dangerous, and is sure to be productive of widespread harm. To determine the value of any new method of treatment for syphilis requires years of study by many observers. Each burst of publicity for new royal roads to cure drives many patients from the narrow and disagreeable path of proven standard methods in chase of an elusive will-o'-the-wisp, a chase which usually leads to disappointment and disaster. If this disappointment and disaster affected only the individual patient, it would be bad enough; unfortunately, it may affect the public health as well, and in part undo the good accomplished by years of patient plodding.

I may perhaps be forgiven if I emphasize the point that the value of prophylaxis and treatment in the control of syphilis depends almost entirely on the state of mind of the public health officer. In the past, he has only too often taken the attitude that syphilis has always been with us and always will be; that he cannot move faster toward its control than public opinion will permit; that public opinion is not ready for the honest discussion of such a disagreeable and loathsome problem; and that nothing can be done about it. "What's the use?" has been his slogan.

> "Similar campaigns have failed in the past; this one is sure to fail now. One can talk to one's public about such clean diseases as typhoid fever; one can appeal to every parent about diphtheria, measles, scarlet fever; but syphilis—well, nice people don't have syphilis, don't want to hear about it, and aren't interested."

So long as there continues to exist this confusion of morals and medicine, so long as the public health officer refuses to admit that he has a problem in syphilis, so long as he adopts the defeatist attitude of refusing to try to do anything about it, so long will syphilis be the greatest of our infectious disease problems.

If the day comes when the public health officer realizes that morals and the control of disease have no close relation; when he views syphilis in its proper proportion (as to incidence and gravity) to other infectious diseases; when he awakens to the fact that the public knows little or nothing about syphilis and that with this disease of all others he must lead public

opinion, not follow it; when he becomes aware that syphilis can be controlled by modern methods of prophylaxis and treatment; when he begins to give his whole-hearted support to adequate provision and financing of these methods of control within his own province, large or small; then, and not until then, shall we begin to answer the question, "Why don't we stamp out syphilis?" Fortunately, that day seems close at hand!

BIBLIOGRAPHY

1. Warren, Carl: On Your Guard: The Prevention and Treatment of Sex Diseases. New York, New York: Emerson Books, Inc., 1937.
2. Sonnenberg, E.: Neuf ans de traitement preventif bismuthique de la syphilis. Bull. Acad. de Med., Paris, **114**:374, 1935.

A REVIEW OF ECLAMPSIA AT THE MEDICAL COLLEGE OF VIRGINIA HOSPITALS*

By H. HUDNALL WARE, JR., M.D.
and
FRANCES E. NOBLIN, M.D.
Richmond, Virginia

This paper will be limited to a review of one hundred and five cases of pregnancy manifesting signs of toxemia with convulsions. These patients were admitted during a five-year period from December 31, 1930, to January 1, 1936, and for convenience of discussion may be divided into two groups according to the treatment they received.

During the five years we admitted for observation or delivery 5,183 patients, and 4,434 of these were delivered. *Table 1* shows that 591, or 11.4 per cent of the patients, had some type of late toxemia of pregnancy as evidenced by hypertension, albuminuria, headache, edema and visual disturbances with or without convulsions. Of these 591 cases of toxemia of pregnancy, 105, or 17.76 per cent had convulsions, giving an incidence of eclampsia in 2.02 per cent of all admissions for late pregnancy.

Table 1

INCIDENCE OF TOXEMIAS AND ECLAMPSIA

	Toxemias		Eclampsia		
Total No. Cases	Number	Per Cent of Total	Number	Per Cent of Total	Per Cent of Toxemias
5183	591	11.40	105	2.02	17.76

*Read in Section on Obstetrics, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Obstetrics, Medical College of Virginia.

Stander[1] reports an incidence of eclampsia in 1.21 per cent of a collected group. Kimbrough and Shirey,[2] at Philadelphia Lying-In Hospital, report an incidence of 0.34 per cent, and Brame,[3] at the University of Virginia, reports an incidence of eclampsia of 2.85 per cent. The frequency of eclampsia in our patients and those reported by Brame is due to the fact that both hospitals serve a wide surrounding territory and admit a very high percentage of emergency cases.

Table 2 shows no striking seasonal variation in the occurrence of eclampsia. This may be due to the limited number of cases reported. Harrar[4] has shown in a large group of cases at the New York Lying-In Hospital that the incidence of eclampsia in pregnancy reaches a peak in the month of April.

Table 2

ECLAMPSIA MONTHLY INCIDENCE

	1931	1932	1933	1934	1935	Total Patients	Total Deaths
January	5	1	4	1	1	12	2
February	2	3	2	1	0	8	1
March	1	3	3	1	1	9	1
April	0	2	1	1	2	6	0
May	0	5	3	4	2	14	0
June	3	2	2	2	3	12	0
July	1	5	3	4	1	14	3
August	0	2	2	1	2	7	1
September	2	3	0	1	2	8	3
October	1	1	0	1	1	4	1
November	3	0	1	0	2	6	3
December	2	0	0	3	0	5	1
Total	20	27	21	20	17	105	16

Table 3 indicates the maternal mortality in reference to age. As stated by Peckham,[6] the prognosis in eclampsia is best in the young woman under twenty years of age. This table also shows that there were 47 eclampsia patients in 1931 and 1932 with 12 deaths and in 1933, 1934 and 1935, there were 58 eclampsia patients with 4 deaths. This will be discussed under treatment.

From *Table 4*, it would seem evident that good prenatal care will reduce both the incidence of

Table 3

INCIDENCE IN REFERENCE TO AGE

	1931	1932	1933	1934	1935	Total Patients	Total Deaths
15 to 20 yrs	12	11	10	12	10	55	4
20 to 25 yrs	5	8	4	3	4	24	4
25 to 30 yrs	1	0	3	3	2	9	2
30 to 35 yrs	1	3	1	1	1	7	4
35 to 40 yrs	0	2	3	1	0	6	1
40 to 45 yrs	1	3	0	0	0	4	1
Total	20	27	21	20	17	105	16
Maternal deaths	5	7	1	3	0	16	16

7 patients, or 6.66 per cent, were 15 years of age.
6 patients, or 5.71 per cent, were 16 years of age.
16 patients, or 15.20 per cent, were 17 years of age.
29 patients, or 27.61 per cent, were less than 18 years of age and no deaths occurred in this group.

Table 4

INCIDENCE IN REFERENCE TO PRENATAL CARE

Adequate, 0
Inadequate 35, or 33.33 per cent; 4, or 11.42 per cent, died
None 70, or 66.66 per cent; 12, or 17.14 per cent, died

eclampsia and the mortality rate associated with eclampsia.

Table 5 shows the high percentage of cases referred from the rural districts to the hospitals after the onset of convulsive seizures. These patients also partially explain the high maternal mortality rate of hospitals as compared to that of home deliveries, and of cities as compared to that of the rural districts.

Table 5

INCIDENCE IN REFERENCE TO RESIDENCE

Resident of Richmond 55, or 52.38 per cent; 5 died, 9 per cent
Nonresident of Richmond 50, or 47.61 per cent; 11 died, 22 per cent

Table 6 shows the per cent of white and Negro patients. The difference in both the incidence of the disease and the mortality rate for the two races may be due to the indifference of the Negroes to prenatal care.

Table 6

INCIDENCE IN REFERENCE TO RACE

27 patients were white and 3, or 11.11 per cent, of these died
78 patients were Negroes and 13, or 16.66 per cent, of these died

Table 7 shows that eclampsia in multiparas is twice as dangerous as in primigravidas. This has also been shown in Peckham's[5] report of his cases at Johns Hopkins.

Table 7

INCIDENCE IN REFERENCE TO PARITY

Primigravidas 90, or 85.71 per cent; 12 died, 13.33 per cent
Multiparas 15, or 14.28 per cent; 4 died, 26.66 per cent

Table 7 shows the high mortality rate when eclampsia occurs before the twenty-eighth week of pregnancy. It also causes one to question the presence of a true eclampsia in these patients. Autopsies were not obtained and the four patients who died may have had pre-existing renal disease or hypertension.

Table 8

INCIDENCE IN REFERENCE TO DURATION OF PREGNANCY

Full term 39, or 37.14 per cent; 2 died, 5.12 per cent
Premature 60, or 57.11 per cent; 10 died, 16.66 per cent
Abortion 6, or 5.71 per cent; 4 died, 66.66 per cent

In the abortion group, the duration of pregnancy was as follows: 1 patient, 20 weeks; 3 patients, 24 weeks; 2 patients, 26 weeks.

Table 9 shows that six women died before the onset of labor. Three other patients started in labor spontaneously and died before delivery. One of these was delivered by postmortem cesarean section, and the baby lived. The onset of labor was spontaneous in 80, or 76.19 per cent of all cases, but 10 patients, or 12.5 per cent of this group, died.

Table 9

ONSET OF LABOR

	1931	1932	1933	1934	1935	Total	Maternal Deaths
Spontaneous	17	19	13	18	13	80	10
Medically induced	0	1	0	0	0	1	0
Bag	1	3	4	0	0	8	0
Artifical rupture of membranes	0	0	1	0	1	2	0
Cesarean section before labor	0	1	2	1	3	7	0
Died before labor	1	3	1	1	0	6	6
Not stated	1	0	0	0	0	1	0

Table 10 shows an apparent error in total figures. This is due to the fact that one forceps

Table 10

METHOD OF DELIVERY

	1931	1932	1933	1934	1935	Total	Maternal Deaths	Per Cent
Spontaneous	7	17	14	12	12	62	4	6.45
Forceps	10	4	1	2	1	18	2	11.11
Version	0	0	0	1	0	1	0	0.00
Breech extraction	1	1	3	0	0	5	0	0.00
Cesarean section	0	2	2	3	3	10	2	20.00
Craniotomy	0	0	1	1	1	3	1	33.33
Undelivered	3	3	1	2	0	9	9	100.00

extraction was done postmortem, and another patient had a postmortem cesarean section. The other cesarean section was done on a moribund patient twenty-six weeks pregnant. Consequently, the mortality rate for forceps should be corrected to 6.53 per cent and the rate for cesarean section should be zero.

This table shows a definite decrease in maternal mortality during the years in which spontaneous deliveries have increased.

Table 11 shows that according to the classification advocated by Peckham, 56.19 per cent of our eclamptic patients fall in the severe group. Here again our statistics, both as to severe cases and the maternal mortality, are due chiefly to the fact that we admit to our hospitals a high percentage of emergency cases.

Table 11

CLASSIFICATION ACCORDING TO SEVERITY

Class	Number	Per Cent	Deaths Number	Deaths Per Cent
Eden Severe	57	54.28	15	26.31
Eden Mild	48	45.61	1	2.08
Peckham Severe	59	56.19	15	25.76
Peckham Mild	46	43.80	1	2.17

A study was made of certain blood constituents in 92 patients. The blood sugar was determined once or more on each patient. The lowest blood sugar was 52 mg. and the highest was 200 mg. per 100 c. c. of whole blood. In a few cases a marked hypoglycemia was noted preceding the onset of convulsions and a relative hyperglycemia shortly after the convulsive seizure. This observation has been reported by Titus[6] and confirmed by Laferty and others.

Table 12

INCIDENCE IN REFERENCE TO LABOR

	1931	1932	1933	1934	1935	Total	Per Cent
Antepartum	18	21	18	16	13	86	81.90
Intrapartum	0	0	1	1	0	2	1.90
Postpartum	2	4	2	2	4	14	13.33
Antepartum, intrapartum, and postpartum	0	1	0	1	0	2	1.90
Antepartum and intrapartum	0	1	0	0	0	1	0.95
Intrapartum and postpartum	0	0	0	0	0	0	0.00

86 patients had antepartum eclampsia and 13, or 12.38 per cent, died.
2 patients had intrapartum eclampsia and both died, 100 per cent.
2 patients had antepartum, intrapartum and postpartum eclampsia, and 1 died, 50 per cent.
15 patients had postpartum eclampsia and no deaths occurred in this group.

Table 13

MATERNAL DEATHS IN REFERENCE TO TIME IN HOSPITAL

A study of the maternal deaths shows that
1 patient was in the hospital 30 minutes before death.
4 patients were in the hospital from 1 to 6 hours before death.
1 patient was in the hospital 12 hours before death.
5 patients were in the hospital 12 to 24 hours before death.
1 patient was in the hospital 36 hours before death.
1 patient was in the hospital 2 days before death.
1 patient was in the hospital 3 days before death.
1 patient was in the hospital 4 days before death.
1 patient was in the hospital 7 days before death.
A patient who died on the fourth day had myelogenous leukemia.
A patient who died on the seventh day had a pulmonary embolus.
Three patients had congestive heart failure.
From this group of 16 maternal deaths five living babies were discharged.

Blood uric acid was determined once or more on 27 patients. In our cases this determination was of little value in estimating the prognosis. Here again failure to determine the uric acid at frequent intervals may have decreased the usefulness of this test.

Treatment.—We believe that good prenatal care will reduce the incidence of eclampsia, but we do not believe the disease is entirely preventable. Early recognition of the signs of toxemia, hypertension, albuminuria, headache, and edema, necessitate careful study of the patient. Failure to respond to diet, rest, and elimination probably indicates the advisability of interrupting the pregnancy.

For the convulsive patients, we carry out the usual routine of nursing care. We give intravenously 20 c. c. of a 10 per cent solution of magnesium sulphate followed immediately by 500 to 1,000 c. c. of 10 per cent dextrose solution in sterile distilled water. This usually controls the convulsions and frequently the patient regains consciousness almost immediately. If conscious, we give one ounce of 50 per cent magnesium sulphate by mouth, and 6 to 8 grains of digitalis. If she remains comatose, we do a gastric lavage and give the above named drugs by tube.

The magnesium sulphate[7] solution of 10 per cent, may be repeated in one to two hours if indicated, but we give only three intravenous injections of this drug in twenty-four hours. Stander[1] has stated that not more than 60 c. c.

or 6 grams of this drug should be given within twenty-four hours, and we have followed his suggestion. We particularly wish to emphasize the importance of having easily available some preparation of calcium suitable for intravenous administration. We use calcium gluconate. We also wish to point out the importance of giving digitalis[8] to patients receiving intravenous magnesium salts. It has been proven that digitalis leads to marked increase in cardiac tonicity and irritability, particularly of the ventricular muscle; the reverse is true for magnesium salts. Hence as far as the heart is concerned, these substances are physiological antagonists. Therefore, digitalis should tend to overcome any cardiac depression possibly produced by the intravenously injected magnesium salts.

Dextrose solution intravenously may be repeated in ten to twelve hours as indicated. If the patient is awake, sufficient fluids in the form of water and sweetened fruit juices can usually be given by mouth. We do not believe in restricting fluids except in cardiac cases, and patients manifesting signs of pulmonary edema. Phlebotomy is resorted to only in this group.

If restlessness persists after one injection of magnesium sulphate, we usually give sodium iso-amylethyl barbiturate grains 6 or 9, or pentobarbital sodium nembutal grains 3 or 6, per os or rectum. These drugs not only quiet the patient, but they give good analgesia if she goes into labor, and they may be repeated as indicated.

We have found it unnecessary to use morphine except in the rare case, and as previously stated, we use phlebotomy only in the event of signs or symptoms of pulmonary edema. Colonic irrigations have not been used in the last two years.

In support of this treatment, we may refer to our maternal mortality of 25.53 per cent for 1931 and 1932 when we used morphine, bromides, and chloral. Compare this with our maternal mortality of 6.88 per cent for the last three years, 1933, 1934 and 1935, using magnesium sulphate, glucose and digitalis. Last year we attended 17 eclamptic patients with no maternal deaths and 15 living babies. Rucker[9] has reported 123 cases treated in approximately the same way, with only six maternal deaths, a mortality rate of 4.87 per cent.

Our treatment usually controls convulsions, and most patients go into labor spontaneously after they have improved. In *Table 9* we find that in 1935, thirteen of seventeen patients had a spontaneous onset of labor and twelve of these delivered spontaneously. We seldom induce labor unless after a period of improvement the patient shows signs or symptoms of increasing toxemia.

In a small percentage of eclamptic patients whose convulsions have been controlled by conservative treatment and a few cases which fail to respond to conservative treatment, cesarean section under local or spinal anesthesia probably offers the best method of delivery. In our clinic we reserve this operation for the patient with a borderline pelvis or long, rigid, undilated cervix, because these conditions usually predispose to a long labor and difficult delivery.

SUMMARY AND CONCLUSIONS

(1) A study of our records reveals 105 cases of eclampsia in 5,183 obstetrical cases at the Medical College of Virginia Hospitals, an incidence of 2.02 per cent.

(2) Sixteen maternal deaths occurred, giving an uncorrected maternal mortality of 15.23 per cent.

In 1931 and 1932, the mortality rate was 25.53 per cent.

In 1933, 1934 and 1935 the mortality rate was 6.88 per cent.

(3) Seventeen babies were stillborn, and six newborn babies died, a total of 23, or 23.92 per cent. Therefore, we discharged alive 76.08 per cent of the babies.

(4) Classifying the cases in accordance with Peckham's criteria of severity, it was found that 56.19 per cent of our cases were in the severe group.

(5) A simplified treatment of eclampsia is outlined.

(6) The value of digitalis, magnesium sulphate solution, intravenously in limited amounts and generous amounts of intravenous dextrose solution have been emphasized in our treatment.

(7) We believe that morphine therapy definitely increases fetal mortality.

(8) In a limited number of selected cases, cesarean section under local or spinal anesthesia may be the operation of choice.

(9) A study of our case records impresses

one with the dangers of general anesthesia in eclamptic patients.

(10) The advantages of conservative treatment and non-interference have been discussed.

BIBLIOGRAPHY

1. Stander, H. J.: Williams' Obstetrics, 7th Edition, pp. 741, 777. New York: D. Appleton-Century Co., Inc., 1936.
2. Kimbrough, R. A.; and Shirey, R. M.: Amer. Jour. Obst. & Gyn., **32**:415, 1936.
3. Brame, D. D.: Va. Med. Monthly, **62**:513, 1935.
4. Davis, A. B.; and Harrar, J. A.: J.A.M.A., **87**:233-236, 1925.
5. Peckham, C. H.: Amer. Jour. Obst. & Gyn., **29**:27, 1935.
6. Titus, Dodds and Willets: Amer. Jour. Obst. & Gyn., **14**: 80, 1927.
7. Lazard, E. M.; and Irwin, J. C.: Amer. Jour. Obst. & Gyn., **12**:104, 1926.
8. Haag, H. B.: Personal communication.
9. Rucker, M. P.: Amer. Jour. Obst. & Gyn., **23**:211, 1932.

DISCUSSION (*Abstract*)

Dr. M. Pierce Rucker, Richmond, Va.—My series of cases of eclampsia since the appearance of Lazard's paper on the intravenous use of magnesium sulphate ten years ago, consists of 127 consecutive cases of convulsive toxemia. I have analyzed these to supplement in a way Dr. Ware's tables. Fifty-nine of my patients were colored and 68 white. Thirty-three were unmarried, 25 colored and 8 white. Ninety-one were primiparae and 34 multiparae. In two cases the parity was not stated. The ages varied from 12 to forty years. Twenty-seven or 21.2 per cent were under 18 years of age, and I had one maternal death in that group. From 12 to 20 years I had 57 cases with 1 death. From 21 to 25, I had 33 cases with 2 deaths. From 26 to 30 I had 18 cases with no deaths. From 31 to 35 I had 10 cases with 1 death. From 36 to 40 I had 9 cases with 2 deaths.

The statement is made in the histories of 20 that they received prenatal care. None of the six fatal cases received any prenatal care. The residence of many of my patients is not given, but I have a distinct impression that moving these patients is not good for them. Not only is treatment delayed, which is bad in itself, but the disturbance incident to moving is as bad for an eclamptic as it is for a pneumonia patient.

In my experience there has not been so much difference in the mortality of primiparae and multiparae as Dr. Ware has found. Four of my fatal cases were primiparae, a mortality of 4.4 per cent and two were multiparae, a mortality of 5.9 per cent. My experience differs from his also in the effect of the duration of labor. Of the six fatal cases one had a baby 47 cm. long, one 48 cm. long, one 51 cm. long. In two cases the length of the baby was not stated, but the patients were said to have been at term. One patient died undelivered and she was at term. Among those mothers who recovered, two had fetuses less than 20 cm. in length, one a fetus between 31 and 35 cm; six had babies between 36 and 40 cm. and thirteen babies between 41 and 46 cm. The length of the babies is not given in many of the histories so that I can not give you the exact number of the prematures.

In regard to treatment I agree with Dr. Ware wholeheartedly. I had thought that the use of digitalis in eclampsia was original with me, but in the last number of the *Annals of Medical History* (Vol. VII:492, 1936), Maurice S. Jacobs says that Irish and Welch folklore mentions the external application of foxglove for eclampsia. The only criticism I have of Dr. Ware's teratment is that he does not emphasize rest. He says that he has not used colonic irrigations in the past two years. I wish he had given that statement prominence in his conclusions.

Dr. Charles H. Peckham, Baltimore, Md.—It has been said that far too much has been written on the subject of eclampsia. I do not agree with this. Until the cause of the disease is discovered its logical treatment is impossible. Hence at any given time the best therapy is that resulting in the lowest maternal mortality. It is only by the presentation of analyses such as you have just heard that comparative statistics may be obtained and the profession apprised of the most successful methods at hand.

One wonders whether or not eclampsia is decreasing in severity. Dr. Ware has told you that during the first two years of his study the maternal mortality was 25.53 per cent as contrasted with 6.88 per cent for the last three years during which time the treatment has been altered. At the Johns Hopkins Hospital the mortality rate from 1924 through 1928 was 12.35 per cent, whereas from 1929 to the present a comparative figure of 7.04 per cent has been attained. Throughout this twelve year period there has been no change at all in treatment. It would be interesting to hear the experiences of others on this point.

I think you will agree with me when I say that the only successful treatment now available is prophylactic. Not that eclampsia is a completely preventable disease, at least in the light of present knowledge. However, it is my opinion that 75 per cent of all cases are preventable by adequate prenatal care. In other words, three out of every four instances of eclampsia may be avoided now, provided two things are done. First, physicians must see their obstetric patients at frequent intervals and promptly treat the first manifestations of toxemia. Second, the pregnant woman should report to her doctor early in the process of gestation and demand from him the above care. For the indigent patient this care is usually available through the local health departments which are only too anxious to cooperate if given the opportunity.

For the past twelve years all patients with eclampsia observed on the obstetric service of the Johns Hopkins Hospital have been treated by the so-called modified Stroganoff method. The total to the present time is 152 with 15 maternal deaths, or a mortality of just under 10 per cent. Time does not permit a detailed analysis of this scheme of treatment and I shall only state that it retains the rest and isolation of the patients, the dosages of morphine and chloral, and the non-interference with the pregnancy as advocated by Stroganoff while discarding venesection and the repeated administration of chloroform. In my opinion this therapy is far better than any radical scheme demanding immediate emptying of the uterus. On the other hand, it is prob-

ably little if any better than other conservative schedules and I believe that it makes little difference whether morphine, chloral, magnesium sulphate, barbiturates, paraldehyde or other drugs are used as sedatives provided the patient is sheltered from outside stimuli and the pregnancy left completely alone.

Dr. S. A. Cosgrove, Jersey City, N. J.—The wisdom of the elimination of morphine from his treatment is predicated on the universal recognition of the extreme tendency of these patients to develop pulmonary edema and depression of the respiratory center. The substitution of magnesium sulphate and the barbiturates for the morphine and chloral of the older Stroganoff system of therapy is, I believe, exceedingly salutary.

Dr. Ware's restraint in his whole program of treatment is deservedly reflected in his exceedingly low maternal and fetal mortality. Although a controversial point, I must emphasize that detail in his management embodied in terminating pregnancy after the eclamptic crisis has subsided but the course of the patient's condition presages further convulsive experience.

Our own treatment differs only in detail from his. His use of digitalis as a physiological offset to the potential cardiac depression of magnesium sulphate is well considered, and I believe a worth while addition to his regime. We have not employed it but I think we shall in the future include it. We incline to follow more closely Titus's original method of the use of more concentrated solutions of glucose at rather shorter intervals than Dr. Ware has.

The increased mortality with age and parity is worthy of some thought as indicative of the nature of the disease with which we are really dealing. Not all the convulsive toxemias of pregnancy are really eclampsia within the narrow traditional concept of this condition. On the other hand, there is some reason for believing that eclampsia may be but a forerunner of more definite hypertensive and degenerative organic disease in the individual. The occurrence of convulsions in those more serious stages, therefore, of a consecutive or sequential process, would naturally be attended with a higher mortality. The fact that this mortality does actually occur, may be illuminative therefore, in regard to our basic concept of the unity of the supposed various types of convulsive toxemias.

Dr. Ware (closing).—We wish to emphasize the advantages of conservative treatment.

Frequently we use small doses of phenobarbital for several days after the active convulsions have been controlled and the patient has regained consciousness. Occasionally we give two grains of phenolbarbital sodium intramuscularly and repeat as indicated. Some patients remain quiet and seem less apprehensive when given forty grains of sodium bromide by mouth or by rectum three times daily for a few days.

Our maternal mortality rate of 15.23 per cent may be corrected to 12.12 per cent if we eliminate from our study 6 patients less than twenty-eight weeks pregnant.

PREOPERATIVE PREPARATION FOR CHILDREN*

By CHARLES W. MAXSON, M.D.†
Baltimore, Maryland

In considering preoperative preparation in children it is necessary to divide them into several groups.

(1) The acute or emergency cases.

(2) Those that are elective.

(3) Those in infancy requiring either emergency relief or elective surgery before the age of two.

There are, however, certain fundamental considerations that should be given all groups and ages.

In the new born that may require any kind of surgical procedure, it is essential to give the blood picture some consideration, especially coagulation time. If this is found deficient, it is advisable in acute cases to give either serum or uncitrated whole blood before operation, and not wait until surgery has been undertaken to institute means to bolster the blood picture. I believe that a blood transfusion, preferably whole blood, is more desirable than any other means. In those cases in which operative procedure can be delayed other means may be considered to aid blood coagulation, such as calcium.

I want to draw attention to the importance in the young child of including when feasible a total blood count and hemoglobin estimation. The urine should be collected and tested for acetone and diacetic acid. In those cases that have been vomiting or improperly fed, intravenous glucose should be administered before operation, a duodenal tube should be introduced before the anesthetic, and stomach contents should be emptied. I believe, if this procedure is carried out, that aspiration pneumonia will not frequently occur. Unfortunately, these patients are not seen by the attending surgeon until just before operation and frequently not until the patient is brought to the operating room. Routine preparation too often is left to the inexperienced house officers and frequently delegated by one of these to the first year intern.

---

*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

†Chief, Department of Surgery, South Baltimore General Hospital.

In spite of the fact that there is considerable difference in opinion concerning the importance of the enlarged thymus and the hypertrophy of the lymphatics, the writer believes that all children up to the age of two should have an x-ray examination of their chest whenever it is possible. In acute cases if the thymus is found enlarged, the surgeon will be forewarned and in elective cases proper x-ray or radium treatment can be instituted as a precautionary measure against danger of so-called thymicolymphaticus.

The automobile, a menace to the welfare of the child, is bringing to us in the hospital new and increasing numbers of surgical problems that are first seen in the accident room.

The young child does not tolerate injury as well as the older one. In this group one frequently does not have time to resort to the laboratory for blood pictures and very often not even time for the use of x-ray in diagnosis of fractures. It has been my practice to resort to restorative measures immediately to combat shock and hemorrhage.

During the late war in those cases that were desperately injured and from loss of blood in a precarious condition, it was found practical and relatively safe to transfuse without delay. Laboratory facilities in most cases were inadequate; therefore, blood was used without matching. I was in charge of a resuscitation ward in which I received only those unfit for surgery, that is, those that were moribund. I transfused uncitrated blood without grouping or matching in a very large number of cases without unfavorable reaction or untoward effects. This, I have practiced in my services since. I have had no instance to regret it. I want to make it clear that this has only been done in those cases in which hemorrhage or the loss of blood had made an emergency transfusion imperative.

During the past eighteen years I have been using unmatched citrated blood with equally good results. I have seen too frequently loss of life by waiting for the arrival of donors and the proper matching of blood. I of course do not recommend this procedure except in urgent cases. The technic used in transfusions is that followed in most hospitals today, with this exception: when 1 or 2 c. c. of blood have been given, the flow is stopped for one minute. If there is no reaction, such as respiratory difficulty, flushing of the face or restlessness, transfusion with that blood is continued; but, if there should be any evidence of reaction no more of that blood should be given, but another donor selected. In no instance has this been found necessary.

Dr. Hugh Cabot reported* in 1917 one thousand consecutive blood transfusions given to soldiers without the matching of blood, using the Vincent-Kemp paraffin bottle without a fatality. It was this work that encouraged me to try it on the soldier in 1917. I unhesitatingly recommend this procedure for your consideration.

The older child, as well as the younger, should, I believe, in all instances have a total blood count made, paying special attention to the question of anemia before operative procedure. If the red count is low or the hemoglobin is not above 60 per cent, a blood transfusion should be done before operation. I believe, in so doing, the patient will tolerate surgery with a greater amount of security and a decrease in morbidity as well as mortality. Certainly, one would not consider operating today without giving glucose to those patients who are dehydrated nor should one operate without giving a blood transfusion where the blood picture shows a need for it.

I believe that preoperative medications should be given in an effort to protect the child against operative fear and anxiety, and recommend that parents, relatives and friends be kept away from the bedside of all children as soon as preoperative preparation is begun, and then not allowed to see the child until after the operation. The anxiety and exaggerated fear registered by those present frequently reacts on the ill child to its detriment.

I have used over a period of years one of the following drugs: phenobarbital, codein, bromides and to the older child morphia previous to operation, except in those cases where operation must be immediate, and in these instances I use codein and atropin hypodermatically. During the past five years I have used with a great deal of satisfaction pentobarbital (nembutal). I have found this drug highly satisfactory, preferable in my hands to any other medication. In over one thousand patients between the ages of

*A recent letter from Dr. Cabot states that his impression is that this report was not published in the *British Medical Journal*, but was published by the American Expeditionary Force in pamphlet early in 1917.

two and sixteen we have found that 85 per cent of our cases have reacted to this drug with complete satisfaction to me and my anesthetist; 10 per cent more or less satisfactorily and 5 per cent unsatisfactorily.

I have in few instances used tribromethyl alcohol. I do not recommend it for use in children.

It has been our custom to give nembutal at bedtime by mouth the night before operation. One and a half hours before operation the second dose is given by rectum and half hour before operation atropin is given hypodermatically, and if the patient shows an unsatisfactory result from the nembutal, codein is added and given with the atropin.

We select the dose by age, body weight and general physical condition. We have found that the child tolerates these drugs in relatively high doses and, unless this is considered, results will not be satisfactory. A child weighing 60 pounds is given a grain of nembutal at bedtime by mouth and one and a half or two grains dissolved in 25 c. c. of saline solution by rectum in the morning. It is an interesting fact that a child from birth until the age of 18 has a very much higher normal basal metabolism than that of the adult, which is responsible for its tolerance of larger doses of these drugs.* We frequently find that the child has had a very comfortable night's sleep and when taken to the operating room is profoundly asleep, accepting a general anesthetic without awakening, decreasing on an average of two-thirds the quantity of anesthetic used.

It is our habit to allow all our patients fluids, if desired, until within two hours of the posted operative time.

I feel very strongly that some form of basal anesthetic should be used on children before any major operation is attempted, particularly in those cases in which repeated operations will be necessary.

In conclusion, I want to urge my surgical colleagues to confer more frequently with the child internist before operation. By so doing they may be able to avoid the embarrassment of calling him to see a very ill child whose serious postoperative condition might have been prevented by more careful preliminary preparation.

*Guedel, Arthur E.: Current Researches in Anesthesia and Analgesia, **15**:157 (July) 1936.

THE SURGICAL TREATMENT OF HYPERTENSION*

By ARTHUR M. SHIPLEY, M.D.
and
THOMAS B. AYCOCK, M.D.
Baltimore, Maryland

Blood pressure is maintained by the pumping action of the heart against arterial resistance. Vascular tone is controlled by a combination of endocrine activity and vessel wall behavior. The glands and vessels are well supplied with blood and influenced by their nerve supply. The autonomic nervous system is the mechanism by which this neurogenic-endocrine vascular combination is regulated.

It is an amazingly active and facile partnership that enables the various functions of the body to idle or speed up. The readings of blood pressure are ordinarily made when the individual is quiet, and under similar conditions the blood pressures of healthy humans do not vary very much: a little lower when young and somewhat lower in Asiatic and African races than in the European and American. The blood pressure varies under mental and physical stimuli, but returns very promptly to normal when these stimuli are no longer acting. All of these variations are within the limits of good health.

There are some known conditions, however, that cause blood pressure levels above the normal: hyperthyroidism, suprarenal tumors, eclampsia and disease of the pituitary gland. These forms of hypertension may be cured by proper treatment. Then there is another group of hypertensive diseases due to known causes which are not very amenable to therapy, such as stenosis of the aorta, nephritis and arteriovenous aneurysm.

It is not with any of these conditions, however, that we are concerned in this paper, but with essential hypertension. This is a form of sustained blood pressure above the normal, which, under stimuli, may rise sharply. It is characteristic of this disease that there is a much greater response to ordinary stimuli than is found in normal individuals. These persons often have an emotional instability and are said

*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Surgical Clinics of the University Hospital and City Hospital, Baltimore, Maryland.

to have an unstable vasomotor system. There is a distinct hereditary tendency. These sharp abnormal rises in pressure may be measured in a number of ways. A very simple method is to note the rise when one hand is immersed in cold water.

There are a number of classifications. A satisfactory one is to group essential arterial hypertension, according to time, into early, when the artery is spastic; intermediate, when sclerosis begins to appear; late, when there is advanced sclerosis and malignant, which is characterized by rapid progression. Adson classifies this disease as slow, moderate and rapid and estimates the life expectancy in each group: 10-15 years for slow; 3-4 for moderate; and 18 months for rapid. Keith groups them as benign, early malignant and malignant. This condition affects chiefly the small arteries and arterioles. The blood itself is passive and observation has shown that, as the disease progresses, the arterial wall becomes thick and sclerotic and the lumen narrow.

It is a disease of nearly every age, but is most common in the third and fourth decade. A critical and exhaustive study of the relationship between essential hypertension and peripheral vascular diseases would be interesting. About fifteen years ago, men began to think of essential hypertension as a surgical problem. Low blood pressure in Addison's disease, the cure of paroxysmal hypertension by removal of tumors of suprarenal medulla and the action of epinephrin brought the adrenal into court as the guilty party. The fall in blood pressure under spinal anesthesia led to study of the autonomic nervous system in its relationship to hypertension.

The difficulty encountered in estimating the activity of the suprarenals by examination of the blood has made it impossible to say with accuracy just how far the suprarenals are responsible for essential hypertension, but they are under grave suspicion and different methods have been used surgically to lessen their output.

Crile devoted a great deal of thought and operative skill to denervating the adrenals and in discussing Heuer's paper before the American Surgical Association in 1936, said of denervation: "We could abate essential hypertension in some cases, but in many cases we failed to do so and so we were dissatisfied."

DeCourcy, in 1934, reported resection of both adrenals in the treatment of hypertension. They removed two-thirds of each gland in 6 patients and noticed an encouraging drop in blood pressure. In 1932, Pieri removed one entire suprarenal in two patients without improving the hypertension. The greatest encouragement has been given to adrenalectomy by the removal of tumors of the medulla for paroxysmal hypertension. Successful removal is followed by prompt disappearance of symptoms. Pincoffs and I reported a case operated upon by me in 1929. Fifty-three similar cases have now been collected from the literature. Wilder regards this condition as "the most important evidence thus far obtained in support of the view that certain forms of hypertension may be due to the secretion of excessive amounts of epinephrine."

The main attack surgically upon this disease has been directed at the autonomic nervous system. In 1925, Rowntree and Adson reported removal of the lumbar ganglia on both sides with very transient effects upon blood pressure. Later, Adson attempted to relieve headache in hypertension by removing the cervicothoracic sympathetic ganglia with little success.

First, Adson and then Heuer cut the anterior nerve roots on both sides from the sixth dorsal to the second lumbar inclusive, after performing laminectomy. This brought about interruption of the great and lesser and least splanchnics on both sides and interrupted, also, the first and second lumbar ganglie, as well as destroying the motor nerve supply to the abdominal wall. This operation was followed by an encouraging drop in blood pressure which was in many instances maintained, but the operation is a formidable one and in several patients was followed by transverse myelitis, due possibly to handling of the cord or to the pressure of wound exudates following operation.

Peet reported resection of the greater and lesser splanchnic nerves on both sides at one operation by exposing them in the posterior mediastinum after resection of several inches of the dorsal end of the eleventh rib. At the same time he removes the lower dorsal sympathetic chain, including the tenth, eleventh and twelfth ganglia. Fralick and Peet made a report in May, 1936, at which time they had performed this operation more than 90 times and believed it to be the most satisfactory operation for interrupting the autonomic nerve supply to the kidneys, the adrenals and the vasomotor nerve supply to the upper abdominal viscera. Peet has checked his results in 36 cases, of which 5

were symptom-free; 18 showed an appreciable drop in blood pressure, and 13 were unimproved.

We have performed the Peet operation upon 9 patients, that is, by approaching the greater and lesser splanchnics and the lower dorsal sympathetic chain and ganglia by the supradiaphragmatic route, but have operated first upon one side and later upon the other.

In 1932, Craig introduced an operative approach to the splanchnics by a straight, vertical incision over the kidney region, and later Adson modified it by making a hockey stick incision over the kidney region with the upper end of the incision reaching to the level of the twelfth rib. The vertical portion of the incision runs just vertical to the ends of the transverse processes of the lumbar vertabrae and the lower end curves forward just above the crest of the ilium. After the muscles are incised, the twelfth rib is resected subperiosteally, care being taken not to injure the pleura. A finger is then introduced into the subdiaphragmatic space without breaking through the kidney fat and the subcostal ligament of the twelfth rib is freed, taking pains not to injure the intercostal vessels. The kidney and its fat are pushed gently forward and downward and by careful dissection the splanchnic nerves are found emerging through the crus of the diaphragm. They can be located by their relation to the renal artery which can be easily palpated dorsal to the kidney. The greater splanchnic lies just cephaled to the artery and somewhat nearer the surface. It is quite large and can be followed into the celiac ganglion. In our dissections and operations we have found the greater, lesser and least splanchnics as separate nerves. The latter two are very small and caudate to the greater. Dissection is best carried on with moist cotton balls held by long forceps. The first and second lumbar ganglia are also excised. The chief essentials at this stage are good light and gentleness, so as not to obscure the field with blood. When this portion of the operation is complete the upper pole of the kidney is drawn into the field, the fatty capsule opened and the suprarenal exposed and one-half of it removed. The upper portion is the easier to deal with, because most of its blood supply enters the lower half.

We have operated upon 3 patients through the infradiaphragmatic approach, making 12 in all. In our hands the lower approach is the easier to do and has the advantage of giving a fuller exposure of the splanchnics and allows examination and resection of the suprarenals, if this is thought desirable. It permits interruption of the upper lumbar sympathetic chain and removal of the first and second lumbar ganglia. Few conclusions of value can be drawn from so small a number. Three of these 12 were complete failures. One, a young woman with advanced hypertensive disease, was better as to symptoms and pressure as long as she was in bed. As soon as she became active her pressure returned to its preoperative level and her headaches returned. There was no improvement in her retinitis. Two patients have died since operation: one was a boy 7 years old with late malignant hypertension, who, before we saw him, had had a portion of each suprarenal removed. This boy was operated upon by the upper approach, but the progress of his disease was unaffected. He died two months after operation. The second death was also very late when operated upon. The low approach was done on one side. She made a very gratifying improvement after a few days. Her vomiting and headache disappeared and while there was no improvement in vision, her pressure dropped and she became hopeful and cheerful. She insisted upon going home between operations and within a few weeks had a return of all her symptoms and died of cardiac failure and nephritis.

Of the other nine, one patient has had an interesting history. Before operation she was heart conscious, apprehensive and jittery. She was a moderately advanced case. As soon as she was out of bed and about on her feet her pressure returned to its original level, but she has had a comfortable year and is very grateful. Measured by blood pressure she is unimproved, but she is symptom-free.

Two patients have been operated upon recently and it is too early to know anything about them, except that there is a satisfactory drop in arterial tension. Each of these was operated upon by the subdiaphragmatic route.

Of the remaining six, four are improved and in two there has been no slowing up of the progress of their symptoms. There were no operative deaths.

Preoperative damage and improvement or lack of it are measured by the degree of hypertension. Usually there has been more relative drop in systolic than in diastolic pressure. They are measured also by the condition of the retinal arteries and by the vision. They may be estimated by the kidney function and the condition

of the heart muscle. There are a number of symptoms that are hard to evaluate: headache, heart consciousness, apprehension, wakefulness and others. There are many uncertain and discouraging factors in the surgical treatment of hypertension, but the status of all therapeutic measures directed toward improvement of this condition is far from cheerful.

Interruption of the autonomic nerve supply to a large part of the arterial system, with or without resection of the suprarenals, offers a return of blood pressure levels approximating the normal in a small percentage of early cases; it offers, also, an arrest or slowing of the progress of the disease for longer or shorter periods in a somewhat larger group; it may alleviate the symptoms, with or without any lasting effect upon blood pressure in others, but in a large group it does not lengthen life or improve symptoms. It is too early to quote statistics with any degree of assurance and the long list of abandoned surgical procedures is not heartening.

The better the selection of cases, as to damage to the arterial walls, to the kidneys, to the eyegrounds and to the heart, the better the results are likely to be. These patients pass from mild symptoms of early hypertension through the stages of increasing invalidism to complete disability and death, because two processes are going on side by side. In one group damage to the blood vessels and certain tissues supplied by them are the changes seen in the diseased condition known as essential hypertension. These changes affect chiefly the spastic or sclerotic vessels, the kidneys, the retina and the central nervous system.

In another group, the heart itself will be the chief sufferer. This muscular pump with its chambers aud openings and valves and endothelium; with its amazing ability to contract and relax rhythmically, in spite of disease and disaster, may at last break down in the face of an ever increasing load caused by mounting pressure.

There are a number of experimental studies already published and others being made, which tend to show that the pressure within the vessels will return to normal levels at the end of a varying period, even when the autonomic nervous system is widely destroyed. Of course, it can be said that humans and animals used for experiments are not built just alike and that their reactions are different and it may be further said that experiments carried on in healthy animals do not set up the same conditions that are present in the diseased tissues of the human, but no one wishes to stress these points enough to cloud in any way the search for truth.

We do not know why the autonomic nervous systems of some individuals react more sharply to stimuli than others. We do not understand very clearly the mechanism of essential hypertension and we know almost nothing as to its cause. We are uncertain as to the importance of pressor substances that may be in the blood. In attempting to interrupt the stimuli reaching the arteries, we do not know just how widespread this interruption should be and we are unsettled by the growing knowledge that there are communications between the different elements of the nervous system that reach further afield than was formerly thought to be true. Then our knowledge of the regenerative power of tissues raises other questions as yet unanswered.

Certainly hypertension seems on the increase. Routine examination of college men shows a considerable percentage with blood pressures well above the normal, and life insurance statistics indicate that in the very considerable group of younger men turned down only because of moderate arterial hypertension, there will be, in the fifteen years following such examination, a death rate two and one-half times above the normal for that age group. In the face of this lack of exact knowledge as to the nature of hypertension and of our want of some sure means of combating this disease, we are under the necessity of continuing the method of trial and error. Certainly in the position in which we find ourselves, both as patients and as physicians, it is our duty to hold on firmly to such small gains as we may have made.

BIBLIOGRAPHY

1. Adson, A. W.; and Brown, G. E.: Malignant Hypertension: Report of a Case Treated by Bilateral Section of Anterior Spinal Nerve Roots from the Sixth Thoracic to the Second Lumbar, Inclusive. J.A.M.A., **102**:1115 (April 7) 1934.
2. Adson, Alfred W.; Craig, Winchell, McK.; and Brown, George E.: Surgery in Relation to Hypertension. Surg. Gyn. & Obst., **6**:314 (Feb.) 1936.
3. Adson, Alfred W.: Indications for Operations on the Sympathetic Nervous System. J.A.M.A., **601**:360 (Feb.) 1936.
4. Coller, Frederick A.; Field, Henry, Jr.; and Durant, Thomas M.:Chromaffin Cell Tumor Causing Paroxysmal Hypertension, Relieved by Operation. Arch Surg. **28**:1136 (June) 1934.
5. Craig, W. McK.; and Brown, G. E.: Unilateral and Bilateral Resection of the Major and Minor Splanchnic Nerves: Its Effects in Cases of Essential Hypertension. Arch. Int. Med., **54**:577 (Oct) 1934.
6. Craig, Winchell McK.: The Surgical Treatment of Hypertension. Editorial. Surg Gyn. & Obst. **60**:115 (Jan.) 1935.

7. DeCourcey, Joseph L.; DeCourcey, Carroll; and Thuss, Otto: Subtotal Bilateral Suprarenalectomy for Hypersuprarenalism (Essential Hypertension). J.A.M.A., **102**:1118-1122 (April 7) 1934.
8. Eisenberg, A. A.; and Wallerstein, Harry: Pheochromocytoma of the Suprarenal Medulla. Arch Path., **14**:818 (Dec.) 1932.
9. Fralick, F. Bruce; and Peet, Max M.:Hypertensive Fundus Oculi after Resection of the Splanchnic Sympathetic Nerves. Arch. Ophthal., **51**:840 (May) 1936.
10. Heuer, George J.: The Surgical Treatment of Essential Hypertension. Ann. Surg., **104**:771 (Oct.) 1936.
11. Keith, N. M.: Cardiovascular Diseases in Relation to the Retina. Ann. Otol., Rhin. & Laryn., **42**:95-111, 1933.
12. Kuntz, Albert: The Autonomic Nervous System. Philadelphia: Lea & Febiger, 1934.
13. Kuntz, Albert: The Autonomic Nervaus System. J.A.M.A., **106**:345 (Feb. 1) 1936.
14. Lewis, Dean; and Geschickter, Charles F.: Tumors of the Sympathetic Nervous System. Arch Surg., **28**:16 (Jan.) 1934.
15. Pieri, G.: Rifromma Med., **48**:1173 (July 30) 1932.
16. Pincoffs, M. C.: A Case of Paroxysmal Hypertension Associated with Tumor of Suprarenal. Tr. A. Am. Physicians, **44**:295, 1929.
17. Shipley, A. M.; Paroxysmal Hypertension Associated with Tumor of the Suprarenal. Ann. Surg., **90**:742 (Oct.) 1929.
18. Wilder, R. M.: Recently Discovered Endocrine Diseases: Hyperepinephrinism, Hyperinsulinism and Hyperparathyroidism. Internat. Clinics, **1**:293 (March) 1930.

SUPPURATIVE PERICARDITIS

WITH A REPORT OF EIGHT CASES TREATED SURGICALLY*

By I. A. BIGGER, M.D.
Richmond, Virginia

Suppurative pericarditis is generally believed to be a rare condition, but autopsy statistics indicate that this is not true. Pyrah and Pain[1] from the record of 7,965 autopsies performed at the Leeds General Infirmary from 1921 through 1931 found acute pericarditis in 214 cases, or 2.7 per cent of the total number of postmortem examinations in that institution in that period. Ninety-one of these were of the acute suppurative variety. Stone[2] encountered acute pericarditis 72 times in 300 autopsies on patients who died following pneumonia; in 44 the condition was described as acute purulent, in 14 as acute serofibrinous, and in 14 as subacute fibrinoplastic and purulent. While the latter figures show a higher incidence of pericarditis than usually occurs, they indicate that it is not an unusual complication of intrathoracic infections.

The fact that Shipley[3] has operated upon 12 such cases and the author has operated upon 8 cases, 7 of them during the past seven years, would seem to be further evidence that this condition is not especially uncommon.

Even though the condition is not rare and surgical drainage seems to be the only method of treatment which gives a reasonable chance of cure, very few cases of suppurative pericarditis are operated upon. Shipley and Winslow[4] were able to find only 227 reported cases, including 12 of their own. The most important reason why few patients come to operation is that the condition is not often diagnosed clinically. According to Cabot,[5] 77 per cent of all cases of pericarditis found at autopsy at the Massachusetts General Hospital were not diagnosed before death.

There are probably a number of circumstances which help to account for the great discrepancy between clinical and autopsy statistics on pericarditis. It is never primary, except when it follows penetrating wounds of the pericardium, and does not often produce symptoms sufficiently characteristic to draw attention to the heart; so the antecedent disease is apt to overshadow the clinical picture. Furthermore, most physicians think of it as unusual and therefore do not look for it. This is unfortunate, for while significant symptoms are frequently absent, the physical signs are usually sufficiently characteristic to lead to a correct diagnosis.

Since suppurative pericarditis is especially apt to develop in connection with such thoracic infections as pneumonia and empyema and in bacteremia and septicemia associated with acute osteomyelitis or other severe infections, it is encumbent upon physicians who are attending such cases to make frequent examinations of the cardiac area. This suggestion is especially important to surgeons, for in the group of 91 cases studied by Pyrah and Pain the pericarditis followed so-called surgical infections in 73 instances: empyema preceded it 30 times, acute osteomyelitis 17 times, and various other infections such as abscesses and carbuncles, 26 times; and of the 72 cases of pericarditis following pneumonia reported by Stone, 63, or 87.5 per cent, also had empyema.

SYMPTOMS AND SIGNS

The only symptoms which are more or less constantly present are dyspnea and precordial distress. Pain, though not always present, may be of value in attracting attention to the heart. However, it should be stressed that it is an inconstant finding and even when it does occur it is probably due to involvement of adjacent

*Chairman's Address, Section on Surgery, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Surgery, Medical College of Virginia; with case reports from the Department of Surgery, University of Virginia; Department of Surgery, Vanderbilt University; and St. Luke's Hospital, Richmond, Virginia.

structures, and therefore may be substernal, abdominal, or may radiate to the neck or shoulder. Occasionally angina-like pains occur, due perhaps to interference with the coronary circulation, which idea is supported by the occurrence of electrocardiographic changes similar to those seen in coronary occlusion. Pain was not a prominent symptom in any of our cases.

It is probable that a pericardial friction rub is always present in the early stages of acute pericarditis. It may be heard over the entire precordium or may be detectable over only a limited area, and is usually heard more distinctly during forced expiration. The appearance of a pericardial friction rub in a patient with sepsis should be considered as strong evidence in favor of the development of suppurative pericarditis, and the patient should therefore be examined repeatedly with this condition in mind. Such a rub is positive evidence of pericardial involvement, but is of little significance as an indication of the presence or absence of fluid, as it may persist even in the presence of a large amount of fluid or may disappear rapidly.

Pyogenic infection in the pericardium usually leads to a rapid development of fluid, and if this accumulates in sufficient quantity to distend the pericardium, the cardiac impulse usually disappears and the area of pericardial dullness increases. However, these signs do not become clearly demonstrable until a relatively large quantity of fluid has accumulated. The rapid formation of fluid in the fibrous, relatively inelastic pericardial sac frequently produces cardiac tamponade with the following signs: a pallid cyanosis, distention of the veins of the neck, low systolic blood pressure, low pulse pressure, and distant heart sounds. The pulse is usually rapid and weak and may be paradoxical, but the latter type of pulse is inconstant.

Even in moderate effusions there is usually an area of dullness and distant bronchial breathing below the angle of the left scapula, and in large effusions the entire left base may be dull to percussion. Porter[6] states that the upper border of such an area of dullness presents a reversal of the S-curve found in pleural effusions. A shift of the area of dullness may be demonstrated in some instances by changing the patient's position. However, this is less apt to be the case in suppurative pericarditis than in simple pericardial effusion because of the greater tension in the pericardial sac in the former condition.

Williamson[7] has stressed the importance of a depression of the lower border of the left lobe of the liver in the diagnosis of pericardial effusion, but in some instances the lower border of both lobes of the liver may extend considerably below the costal margin. The latter finding is the result of interference with the flow of blood from the vena cava into the right auricle because of the increased intrapericardial tension, whereas depression of the left lobe of the liver alone presumably is due to direct pressure upon it by the distended pericardium.

Roentgenography and fluoroscopy are invaluable aids in the demonstration of fluid in the pericardium. The increase in the size of the pericardial shadow may be very rapid, as occurred in Case 8 (*Figs. 1 and 2*). Roentgenograms should, when possible, be made with the patient in the erect as well as in the prone position, so as to bring out the change in shape of the pericardial shadow with a change in posture. Hodges[8] feels that this is important in distinguishing between pericardial effusion and marked cardiac enlargement. Fluoroscopic examination is more important in suppurative pericarditis than in simple pericardial effusion, for the greater intrapericardial tension in the former usually obscures the cardiac pulsations.

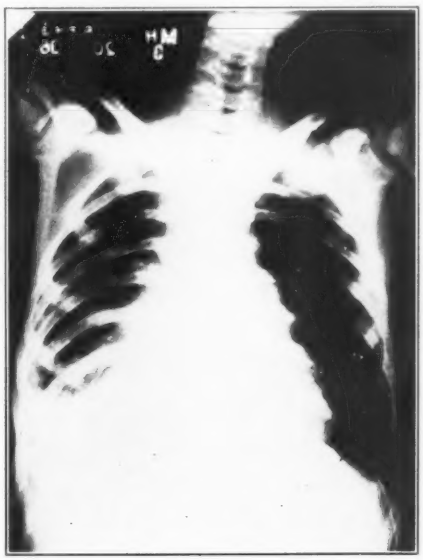


Fig. 1

Case 8. Roentgenogram of the chest made on March 20, 1936, 16 days after drainage of an empyema of the right pleural cavity and one day before the discovery of a pericardial friction rub.

Fig. 2

Case 8. Roentgenogram of the chest made on March 22, 1936, 24 hours after the discovery of a pericardial friction rub. Note the marked increase in the size of the pericardial shadow.

Pericardicentesis is the only method other than exploratory operation by which a positive diagnosis of suppurative pericarditis can be made; but when the evidence is strongly in favor of such a diagnosis, aspiration is probably unjustifiable, as it is not without danger. There is the possibility of contaminating the pleura, of injuring the heart or a coronary vessel, and also of injuring the internal mammary vessels. If there is a reasonable doubt as to the diagnosis, aspiration should be done in preference to surgical exploration. It was carried out preoperatively in four of our cases (*Nos. 1, 3, 4, and 7*).

There is considerable discussion as to the point of election for aspiration of the pericardium, but in suppurative pericarditis either the fifth interspace, about one inch lateral to the left sternal border, or the left costoxiphoid angle should be chosen. Should the latter site be selected, and it seems to be the preferable one in most cases, the needle should be directed upward and backward at an angle of about 45°, to avoid entering the peritoneal cavity. If aspiration is carried out properly by this route, it carries relatively little danger. When the parasternal route is used there is not only the danger of injury to various important structures, but also the distinct possibility of a dry tap if the heart has become adherent to the anterior pericardium, as occurred in *Case 1*).

TREATMENT AND PROGNOSIS

The statement is frequently made that the mortality rate in untreated cases of suppurative pericarditis is 100 per cent and that the results in those treated by aspiration are little better. This is obviously an overstatement, for we occasionally see reports of recovery in untreated cases as well as following aspiration. This may occur either as the result of absorption or of spontaneous evacuation of the exudate, as in the case reported by Davis,[9] but such reports are so unusual that they merely emphasize the importance of adequate drainage.

Many physicians regard suppurative pericarditis as an almost hopeless condition, believing that the chances of survival are very slight and that even though the patient should survive following drainage, the heart would be hopelessly crippled from adhesions. That these ideas are incorrect is shown by a study of the literature on this subject. Shipley and Winslow found that 51.58 per cent of the cases operated upon recovered from the infection. They also found that only 5.15 per cent of those cases available for follow-up study had acquired crippling intrapericardial adhesions. The recovery rate of cases appearing in the literature is no doubt somewhat high, for unsuccessful cases are less likely to be reported than successful ones; but it is probable that from 40 to 50 per cent recover after adequate drainage. In this connection it should be emphasized that most deaths following adequate drainage are due to associated lesions such as abscesses in the kidneys, liver or other organs (*Cases 3, 5,* and *7*).

SUMMARY

Suppurative pericarditis is not a rare condition, but is infrequently diagnosed because in the absence of characteristic symptoms it is not suspected and is not looked for.

It is never primary, but is always secondary to infection elsewhere except when it results from direct trauma. The most important antecedent infections are pneumonia with empyema and osteomyelitis with an associated blood stream infection.

Since recovery is rare without adequate drainage, it is essential that physicians make frequent, careful examinations of the cardiac area

in patients with severe infections. This is especially important in intrathoracic infections, or distant infections with associated bacteremia or septicemia.

Eight cases of suppurative pericarditis treated by surgical drainage are reported. Four recovered and four died, but only two of the deaths were attributable to the pericardial infection.

CASE REPORTS

Case 1.—L. Y., a white girl, 9 years of age, was admitted to the University of Virginia Hospital on the pediatric service on April 14, 1925, with a diagnosis of empyema of the right pleural cavity. Three weeks before this she developed influenza which was followed by pneumonia, from which she appeared to be recovering when she developed a second rise of temperature and showed signs of fluid in the right pleural cavity. When she entered the hospital both physical examination and roentgenograms of the chest indicated large collections of fluid in the right pleural cavity and in the pericardial cavity, so tentative diagnoses of empyema of the right pleural cavity and pericarditis with effusion were made. Purulent fluid was aspirated from the right pleural cavity and the following day intercostal drainage was established. This was not entirely satisfactory, so on April 25, ten days later, the eighth rib was resected and open drainage established. Her general condition still showed little improvement, so another roentgenogram was made on May 15 and this showed that the right pleural cavity was adequately drained, but it also showed a great enlargement of the pericardial shadow and a small amount of fluid in the left pleural cavity. An attempt was made to aspirate the pericardium through the fifth intercostal space a short distance to the left of the sternum, but no fluid was obtained, so aspiration was done through the same interspace a short distance outside the nipple line and 300 c. c. of purulent fluid was removed. Cultures from the right pleural cavity, from the pericardial cavity, and subsequently from the left pleural cavity showed hemolytic streptococci.

On May 16, the day after pericardicentesis, a pericardiostomy was done and the heart was found to be firmly adherent to the pericardium anteriorly, which accounted for the dry tap at the first attempt to aspirate.

The patient's respiratory and circulatory embarrassment was rather promptly relieved following the pericardiostomy, but she continued to have an elevation of temperature, so on May 19 the left pleural cavity was aspirated and 400 c. c. of purulent fluid was obtained. Following the aspiration, 10 c. c. of 1 per cent mercurochrome was injected into the pleural cavity and this procedure was repeated several times. After the second aspiration and injection of mercurochrome, repeated cultures from the left pleural cavity were negative, but fluid continued to form; so in spite of the negative cultures the left pleura was drained on September 2, by resection of the eighth rib. The cavity was then rapidly obliterated and the patient made an uneventful recovery.

A roentgenogram of the chest made on April 15, 1926, was entirely negative and a teleoroentgenogram made on July 8, 1927, more than two years after operation, was also negative. An attempt has been made to get in touch with this patient recently, but she has changed her address and we have not been able to locate her. However, it has apparently been established that she is married and has children.

This patient recovered in spite of an undue delay in draining the pericardium. In view of the extent of the intrathoracic infection, it is hoped that she can be located and the condition of her heart determined.

Case 2.—D. H., a white girl, 5 years of age, was admitted to the Vanderbilt University Hospital, Nashville, Tennessee, on July 5, 1930, complaining of pain in the region of the right hip and thigh. She had been ill for four days and had become progressively worse; at the time of admission her temperature was 106°. Physical examination showed swelling of the entire right thigh with marked tenderness in the region of the greater trochanter of the femur. There were no other significant physical findings at this time. A blood culture showed a large number of colonies of *Staphylococcus aureus*. She was operated upon by Dr. Alfred Blalock and when the upper end of the right femur was trephined some dark bloody fluid was obtained from the medullary cavity, which showed *Staphylococcus aureus* on culture. For several days after operation her temperature ranged between 105-106° and her pulse rate between 140-160. On July 10 her temperature dropped to 101°, her pulse rate to 130, and her respirations to 35, but on the following day, her temperature again rose to 105°, pulse to 150, and respirations to 60. Her general condition became grave and on the same afternoon Dr. Blalock discovered a pericardial friction rub. This was still present on the following day, although the area of the pericardial dullness was increased, the heart sounds were distant, and a roentgenogram showed a marked increase in the size of the pericardial shadow—findings indicative of a large pericardial effusion. Aspiration was not done as the diagnosis of acute suppurative pericarditis seemed definite.

Pericardiostomy was done and a large quantity of thin yellowish pus was evacuated. This gave a pure culture of *Staphylococcus aureus*. The patient made a relatively uneventful recovery.

This patient illustrates the importance of establishing adequate pericardial drainage even in the presence of a very serious general infection.

Case 3.—G. McD., a white boy, 20 months of age, was admitted to the Dooley Hospital, Richmond, Virginia, on August 5, 1931, with a diagnosis of pneumonia. On examination he was found to have tubular breathing over both lungs, and there was a definite expiratory grunt. Moist rales were heard over the right lung; these were especially numerous over the lower lobe. The abdomen was distended and tympanitic, the liver edge was palpable five finger-breadths below the right costal margin; the spleen was not palpable. Although his temperature at the time of admission was only 100.2°, pulse rate 130, respirations 40, his eyes were sunken and he looked acutely ill. The following day the leukocytes were 22,800 and on August 8 his tem-

perature rose to 103°, pulse rate to 140, and respirations to 50.

A roentgenogram on August 7, two days after admission, was reported as follows: "The right lung shows evidence of beginning consolidation of the upper lobe and probably of the lower lobe. The clear-cut nature of the shadow toward the right base suggests the presence of some encapsulated fluid on the mediastinal side." Another roentgenogram on August 10 was reported as showing an increase in the density at the right base and it was thought that the heart had been displaced more to the left. The patient's temperature, after reaching the peak of 103° on August 8, gradually subsided and reached a normal level on August 12, but both the pulse and respiratory rates remained elevated. On August 15 his rectal temperature was 99.6°, the pulse rate was recorded as 160, and the respirations as 80. The child's condition was obviously extremely serious. The right chest was aspirated through the fifth intercostal space just lateral to the nipple line and 100 c. c. of thin yellowish pus was evacuated. Surgical consultation was then requested.

A few hours later, when examined by the surgical staff, the child appeared to be moribund. His respirations and pulse were both so rapid that they could not be counted, and his rectal temperature was only 99.2°. Examination of the chest revealed crepitation around the point of aspiration, which indicated that the lung had been penetrated before pus was obtained. The percussion note was dull over practically the entire anterior portion of the chest. The heart sounds were barely audible and it seemed evident that there was a large amount of fluid in the pericardial cavity, as the clinical picture was that of pericardial tamponade. A tentative diagnosis of suppurative pericarditis was made and immediate operation was advised.

Pericardicentesis was done in the operating room and frank pus was obtained, so pericardiostomy was performed immediately and approximately 300 c. c. of thin yellowish pus was evacuated. Culture from this fluid revealed *Staphylococcus aureus*. The patient improved for several days, then became worse and died 16 days after operation. Autopsy revealed septic pulmonary infarcts, bronchopneumonia, bilateral subacute pleuritis, fibrinopurulent peritonitis, and mitral endocarditis.

This case shows that adequate drainage should be established even though the patient appears to be moribund, for although the child died eventually, there was distinct improvement following relief of the intrapericardial pressure.

Case 4.—A. McD.,* a white boy, 14 years of age, developed a pericardial friction rub three days after a total pneumonectomy for bronchiogenic carcinoma, performed on March 11, 1932. On the day on which the rub was discovered his leukocyte count was 52,000. A roentgenogram made on this date, March 14, and another made on March 21, showed no appreciable increase in the size of the pericardial shadow, but another roentgenogram made on March 28 showed a greatly enlarged pericardial shadow.

*A complete report of this case was made in a previous publication, The Southern Surgeon, 4:401, 1935.

On March 29 the pericardial sac was aspirated and 500 c. c. of yellowish purulent fluid removed, so a pericardiostomy was done on the following day. Cultures from the fluid showed *Staphylococcus aureus*.

Following drainage of the pericardial sac, the patient's condition showed marked improvement and the temperature gradually came down to between 100-101°, but the pulse rate remained elevated. After about ten days his lower extremities became edematous and he rapidly developed ascites and enlargement of the liver. The pericardium was explored for walled-off pus, but none was found. Death occurred on April 21, 1932, three weeks after the pericardiostomy.

Autopsy revealed a purulent pleuritis, left; pericarditis (no localized collection of pus); intrapericardial constriction of the inferior vena cava by pericardial adhesions; hydrothorax, right; hemorrhagic infarcts of the right lung; a thrombus in the left auricle; chronic passive congestion in the kidneys, liver, and spleen.

This patient presented the unusual finding of obstruction to the great veins by adhesions resulting from acute pericarditis. This might have been avoided if drainage had been established earlier.

Case 5.—J. K., a white boy, 12 years of age, was admitted to the Dooley Hospital, Richmond, Virginia, on the pediatric service on January 31, 1934, complaining of pain in his legs. He was apparently well until four days before admission when he developed a severe headache and fever. The following day he began to have pain in his lower extremities, most marked in his knees, which according to the history became swollen and red. The ankles also were somewhat red, swollen, and painful. He complained of pain in the arms and back, but there was no localized evidence of infection except in the lower extremities.

On admission to the hospital he appeared acutely ill. On physical examination both ears were red; there was marked labial herpes; the throat showed nothing of especial importance, but the cervical lymph nodes were enlarged. The area of cardiac dullness was not apparently increased, there was a soft blowing systolic murmur over the mitral area which was not definitely transmitted, and a murmur was heard during both systole and diastole in the second interspace to the left of the sternum. There were no significant findings in the lungs. The abdomen was somewhat tense, but the liver edge could be palpated a short distance below the costal margin and there was tenderness over the right kidney. The left ankle was red, swollen, and tender; the calf muscles were tender on pressure, and the inguinal lymph nodes were moderately enlarged and tender. There was an indurated ulcer over the left elbow, which was said to have been present for about two weeks.

His temperature on admission was 101.4°, promptly rose to 104°, and ranged between 101 and 104° until February 4, when it reached 105.6°. The pulse rate was only 100 at the time of his admission, but it rose steadily and by February 3 reached 140. His respirations gradually rose to 40-45. A blood culture taken on February 1 showed *Staphylococcus aureus*. On February 4 the leukocyte count was 25,000, polymorphonuclear neutrophils 88 per cent.

A roentgenogram of the ankle on February 2 was negative for bone disease. He was given 175 c. c. of citrated blood on February 3. On the afternoon of February 4 a friction rub was heard over the cardiac area. On February 5 the area of cardiac dullness was definitely increased and the friction rub could be heard and felt. A note by Dr. Louise Galvin made at 3:00 p. m. on February 5 stated that the area of cardiac dullness was increasing, the sounds were faint, and the friction rub was still present. Roentgenograms of the chest on February 4 in the prone and upright positions showed no apparent change in the shape and size of the pericardial shadow. On February 5 the pericardial shadow was enlarged and its shape suggested an effusion, so a diagnosis of suppurative pericarditis was made. There were also scattered areas of density throughout both lung fields; these were more pronounced on the right. At 5:00 p. m. the patient was given 200 c. c. of citrated blood.

He was seen in surgical consultation a short time after the transfusion and operation was advised in spite of the fact that the pericarditis was apparently only a part of the picture. He was operated upon at 8:00 p. m. on February 5 under local anesthesia. At the beginning of the operation his systolic blood pressure was 90 and at the completion of the operation it was 110. A very considerable quantity of yellowish, seropurulent fluid was evacuated from the pericardium. Smears and cultures from this fluid showed *Staphylococcus aureus*. Although the patient's general condition seemed to be temporarily improved, the following day it was again extremely serious and became progressively worse. He died on February 8, 1934. Autopsy was not obtained.

Case 6.—E. S. M., a white girl, 10 years of age, was admitted to the St. Luke's Hospital, Richmond, Virginia, on May 12, 1935, with a history of having developed pneumonia three weeks previous to that time. At the time of admission to the hospital she was examined by Dr. Powell Williams, who found the physical signs of fluid in the right pleural cavity and a pericardial friction rub. Her temperature was 103.6°, pulse rate 140, respirations were from 40 to 50 per minute. She was dyspneic and slightly cyanotic.

A roentgenogram of the chest showed evidence of fluid in the right pleural cavity extending as high as the third rib and a marked enlargement of the pericardial shadow. Diagnoses of empyema of the right pleural cavity and suppurative pericarditis were made. The child's condition seemed critical, so immediate operation was advised.

The operation was carried out under local anesthesia while the child was given oxygen through a gas mask for the relief of her cyanosis. A considerable quantity of thin, seropurulent fluid was evacuated. Both the pericardial and epicardial surfaces were covered by a shaggy inflammatory membrane which suggested a streptococcus infection. Cultures from this fluid were reported as showing non-hemolytic streptococci.

The following morning the patient's general condition was considerably improved, the pulse rate gradually came down to about 120, and the temperature to 100°. Six days after the pericardiostomy, on May 18, the right pleural cavity was drained by the intercostal closed method. A considerable quantity of moderately thick, creamy pus was evacuated through the catheter; cultures from this pus also showed nonhemolytic streptococci. From this time on the patient's progress was satisfactory and she was discharged from the hospital on June 7, 1935, 26 days after the pericardiostomy.

Case 7.—J. D., a colored boy, 16 years of age, entered the St. Philip Hospital, Richmond, Virginia, on June 22, 1935, complaining of precordial pain, shortness of breath on exertion, loss of appetite, loss of weight, and night sweats. The patient had apparently been healthy until January, 1935, when he developed a non-productive cough. He soon became short of breath on exertion and at times expectorated small amounts of blood-tinged sputum. He began having night sweats and during the day was found to have a low-grade fever. His condition showed little change until the early part of June, 1935, when his symptoms increased in severity, so he was referred to the hospital.

At the time of his admission the patient was moderately emaciated and apparently dehydrated, the skin being scaly and dry. The superficial veins of the neck became distended when he was placed in the horizontal position. The left side of the chest appeared distinctly fuller than the right, showed marked limitation of motion, and was dull to percussion below the third rib in front and below the scapula posteriorly. The percussion note over the right lung was somewhat hyperresonant and the breath sounds were exaggerated. The supracardiac dullness was 9 cm. across at the level of the third interspace. The pericardial dullness was 19 cm. across, extending 8 cm. to the right and 11 cm. to the left of the mid-sternal line.

His temperature on admission was subnormal, 97° F., and his pulse rate ranged between 100 and 110, at times being difficult to count. The cardiac sounds were distinct and there were no adventitious sounds. The abdomen was distended and obviously contained a considerable quantity of free fluid; the lower border of the right lobe of the liver extended 3 cm. below the costal margin. There was no peripheral edema.

A roentgenogram of the chest on June 24 showed widening of the upper mediastinum and marked density over the lower two-thirds of both lung fields; the heart shadow extended almost to the periphery of the right lung field and there was a dense shadow in the left chest from the level of the sixth rib posteriorly to the diaphragm and out to the lateral chest wall. The clinical diagnosis of pericarditis with effusion was confirmed. An electrocardiographic tracing made on June 27 was reported by Dr. Kinloch Nelson as showing evidence of myocardial damage, but it was stated that a similar tracing might be obtained in pericarditis with effusion.

The patient appeared to be relatively comfortable except for a moderate degree of dyspnea, which was greatly increased by exertion. The pericardial sac was aspirated on June 26 and 10 c. c. of purulent fluid obtained; it was again aspirated on June 27 and 700 c. c. of brownish purulent fluid removed and 120 c. c. of air injected. On June 30, 250 c. c. of purulent fluid was removed. Following each pericardicentesis the patient's condition improved and his dyspnea was relieved, but he developed a low grade elevation of temperature which occasionally reached 101°. Repeated cultures of the pericardial fluid showed non-hemolytic streptococci. Although the history was atypical, the repeated finding of non-hemolytic streptococci in the

cultures seemed to indicate definitely that the patient had a pyogenic infection in the pericardial cavity, probably superimposed upon a tuberculous pericarditis, so pericardiostomy was advised.

The patient was operated upon on July 18 under local anesthesia and a very large amount (several hundred cubic centimeters) of thick, creamy, odorless pus was evacuated. A section of pericardium which was excised for microscopic examination showed evidence of both tuberculous and pyogenic infection.

Following operation the patient's condition was temporarily considerably improved; the liver decreased in size, the abdominal fluid disappeared, and he was less dyspneic. About two months after operation the liver again began to enlarge and the ascites recurred. The size of the liver increased rapidly, so that by the middle of October, 1935, the lower border of the right lobe of the liver extended to the level of the umbilicus. The pericardial cavity had continued to drain pus and injection of iodized oil showed that there was a considerable residual cavity to the left and posteriorly. At about this time it was noted that the patient was jaundiced and this became progressively more pronounced. He was running a normal temperature, but his pulse rate remained elevated to around 100. It was decided that he had a partial obstruction of the inferior vena cava, so he was operated upon again, with the idea of freeing the adhesions around the vena cava and at the same time removing the thickened exudate from the residual cavity on the left. It was hoped that by such a procedure the venous obstruction could be relieved and the chronic pericardial cavity also obliterated.

He was operated upon on October 31 and these procedures were carried out. He stood the operation well, but two days later his temperature became elevated to 101° and ranged between 100 and 101° for several days. It then rose sharply to 104° and fluctuated for several days between 99.6 and 104°. The peritoneal fluid rapidly disappeared and the size of the liver decreased, but his jaundice increased and on November 15 his icteric index was 106 units. His general condition became progressively worse and he died on November 18, 1935, nearly three weeks after his last operation.

At autopsy, the pericardium was greatly thickened and the epicardium varied from 2 to 5 mm. in thickness. The myocardium was flabby and of a pale brown color, but no tubercles were demonstrated in it. The endocardium, including the valves, was negative. The abdominal cavity contained only about 75 c. c. of fluid. The liver weighed 1,200 grams, the edge was sharp, the surface uneven and granular. The capsule showed areas of fibrous thickening and a peculiar slate-like color, and the cut surface varied from dark brown to green. Microscopic sections revealed the formation of pseudolobules, although the interlobular connective tissue was not present in unusually large amounts. The anatomic diagnoses were: tuberculous pleuritis, left; chronic passive congestion with cardiac cirrhosis of the liver; multiple abscesses of the kidneys; confluent bronchopneumonia, right lower lobe; hemorrhagic foci, right upper lobe. Five different blocks of pericardium failed to show evidence of tuberculosis.

There appears to be little doubt that this patient had a tuberculous pericarditis which became secondarily infected with pyogenic organisms. He presented a number of unusual problems, one of the most interesting being the firm fusion of the pericardium and epicardium on the right side of the heart, with obstruction of the inferior vena cava, and a rather large infected cavity on the left side. It would probably have been wiser to have excised the thickened, adherent pericardium over the right side of the heart and liberated the adhesions around the inferior vena cava through an incision to the right of the sternum, leaving the residual cavity on the left side to be attended to at a later date.

Case 8.—C. W., a white boy, 18 years of age, was admitted to the Memorial Hospital, Richmond, Virginia, on the medical service on February 21, 1936, with a diagnosis of lobar pneumonia of the right lower lobe. At the time of admission his temperature was 104°, leukocytes 22,000, 92 per cent polymorphonuclear neutrophils. The sputum showed pneumococci, Type 4. A roentgenogram of the thorax showed increased density over the lower lobe of the right lung. On the day after admission to the hospital his temperature dropped to 100°, but on the following day it was 102°, and it then ranged between 101 and 103° until March 3, when it went to 104.4°. Another roentgenogram on March 2 showed a uniform density throughout the right thorax, which was interpreted as a large collection of fluid in the right pleural cavity. A diagnosis of empyema was made and the right pleural cavity drained on March 4. Following drainage of the empyema the patient's temperature did not subside completely, but ranged between normal and 102°. Roentgenograms of the chest on March 10 and March 20 showed satisfactory drainage of the empyema cavity and otherwise were essentially negative. A pericardial friction rub was heard on March 21 and on this date his temperature rose to 103.4°. The following day the area of pericardial dullness had increased in extent, but the friction rub was still present. Another roentgenogram on March 22 showed a marked enlargement of the pericardial shadow with the rather characteristic water-bottle shape found in pericarditis with effusion. A diagnosis of suppurative pericarditis was made and immediate operation advised. Aspiration was not deemed necessary.

At the time the patient was carried to the operating room he was dyspneic, slightly cyanotic, his pulse was rapid and of poor quality, and he was sweating profusely. His blood pressure was 90 systolic, 60 diastolic. When the pericardium was incised, fluid spurted out under considerable pressure and almost immediately the blood pressure rose to 120 systolic, the pulse showed a marked improvement in volume, and the rate slowed. The fluid was cloudy, straw-colored, and contained considerable fibrin, and there was fibrin over both the pericardium and epicardium. Cultures from the fluid showed pneumococci.

The following day his temperature dropped to 101° and remained at a low level, except for a rather sharp rise to 102° on March 31, nine days after operation. His general condition showed continued improvement, but, unfortunately, he developed an infection of the costal cartilages, first on the left side and later on the

right side of the thorax. This prolonged his convalescence, but he has now recovered.

REFERENCES

1. Pyrah, L. N.; and Pain, A. B.: Lancet, **1**:905, 1933.
2. Stone, W. J.: J.A.M.A., **73**:254, 1919.
3. Shipley, A. M.: Ann. Surg., **103**:698, 1936.
4. Shipley, A. M.; and Winslow, Nathan: Arch. Surg., **31**:375, 1935.
5. Cabot, Richard: Facts About the Heart. W. B. Saunders Company, Philadelphia, 1928. (Quoted by White, R. J., Sou. Med. Jour., **25**:364, 1932.)
6. Porter, W. B.: The Cyclopedia of Medicine, **3**:241. Philadelphia: F. A. Davis Co., 1934.
7. Williamson, C. S.: J.A.M.A., **77**:2050, 1921.
8. Hodges, Fred M.: Jour. Radiol., **4**:351, 1923.
9. Davis, H.: Va. Med. Monthly, **61**:539, 1934.

ACUTE OSTEOMYELITIS IN CHILDHOOD

DIAGNOSIS AND TREATMENT*

By H. EARLE CONWELL, M.D.
and
JOHN D. SHERRILL, M.D.
Birmingham, Alabama

It is not my desire to bore you with a statistical report of a large series of cases of acute osteomyelitis in children which have been encountered in an orthopedic practice extending over a period of eighteen years. Neither do I expect to present a new method of treatment.

This subject is presented to emphasize modern methods of diagnosis and treatment, to combat certain teachings which are more prevalent now than ever, which recommend the expectant treatment of this disease.

You realize the importance of early diagnosis and treatment in acute osteomyelitis. Probably no pathologic condition which is usually amenable to early treatment has been more discussed, unless it is acute appendicitis. Both conditions have outstanding cardinal symptoms to aid in their diagnosis and treatment, but yet we see disabilities and even deaths as a result of unnecessary delay in their treatment. No acute infection in childhood can present a more tragic picture of toxemia than acute osteomyelitis (*Figs. 1A* and *1B*).

The question of infection's occurring at different ages should be given consideration. Green[1] says:

"Osteomyelitis in infancy differs in so many respects from osteomyelitis in older children that a separate consideration of the disease in children under 2 years of age is desirable. The usual conception of acute osteomyelitis is that of the syndrome as seen in older children, a disease generally due to *Staphylococcus aureus* (90 per cent), which, after the acute phase, usually adopts a chronic course of long duration, that is, if early treatment is not instituted, with the result of sequestration, persistent sinuses and frequent recurrences . . . . On the contrary, osteomyelitis in infancy, that is, in those under 2 years of age, is a disease more frequently due to *Streptococcus haemolyticus*, in which if the child survives the acute infection the prognosis is complete and rapid recovery can be expected."

Green concludes that osteomyelitis in infancy is a disease of relatively brief duration, with sequestration and recurrences rare and residual lesions in the bone unusual. If the child sur-

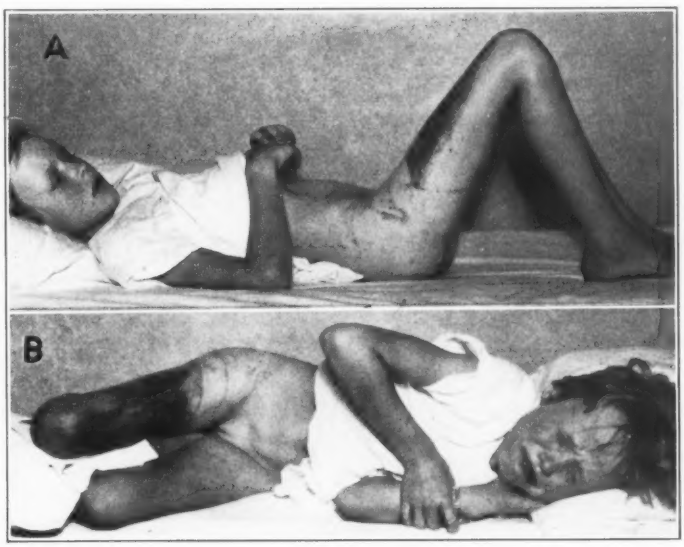


Fig. 1

(A) and (B). Photographs of a child with an acute osteomyelitis of the right femur, duration twelve days. Note the septic condition of the child, the attempt by the child to relieve the pain and muscle spasm by flexing the thigh on the abdomen and the leg on the thigh. This case had been diagnosed and treated as acute muscular (?) rheumatism. Note the medieval method of using emolients which had been prescribed to "scatter" the infection. The localization at the upper end of thigh is easily made out. Drainage by opening the cortex in the upper femur area was carried out; a large amount of pus was found with marked involvement of the femur. Due to the delay in early treatment, this child has marked involvement of the upper end of the femur and hip joint which will disable her for years to come and probably permanently.

*Read in Section on Pediatrics, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

vives the acute illness the mortality rate may be reduced by treating for shock, by allowing localization and carrying out surgical drainage.

The child over 2 years old presents an entirely different picture so far as course, effect and treatment are concerned. It is this type that this paper intends to discuss.

Starr[2] says:

"It is a common experience, especially in the larger children's clinics and general hospitals, to find that an early diagnosis of acute osteomyelitis is rarely made and in many such clinics are found large numbers of cases with extensive and destructive inflammation of bone which must result in long and tedious courses of treatment with the probability of recurring attacks of infection over a period of many years, if not throughout a whole lifetime."

The correct diagnosis, according to Starr, is not difficult in the majority of cases if practitioners and consultants are alert to the probability of occurrence of the disease. The history of the case is most important. The condition is preëminently a disease of childhood and rarely occurs after the epiphyses are completely fused with the shaft of the bone. The infection is blood-borne and is either streptococcic or staphylococcic, staphylococcic infection being the more common and, strange to say, in this instance more virulent. The source of the primary infection in the case of the streptococcus is the mouth cavity, including the tonsils, sinuses and middle ear, while in the case of the staphylococcus it usually rises from the skin surfaces, as from a boil, impetigo or other skin infection. Usually the child is apparently perfectly well, develops a sore throat or has a local skin infection, probably has received an injury sufficient to wrench or twist one of the epiphyses. Traumatism of this type may cause minute hemorrhages in the region of the metaphysis, making a good culture medium for micro-organisms and at the same time lowering the resistance of this part to infection. A few days subsequently, pain and tenderness develop in the neighborhood of a joint, which is accompanied by signs of general infection, namely, fever often to 103 or 104° F., rapid pulse, dry tongue and a definite leukocytosis with a picture of septicemia.

According to Starr, further:

"In this early stage no signs of bone changes are found; there is no fluid in the joint, no swelling, and usually by careful examinations reasonable motions of the joint may be elicited freely and without pain. This should exclude septic arthritis and acute rheumatic fever with joint manifestation. It is also possible to demonstrate that the pain is adjacent to the joint, but not in it. Tenderness will be marked about the epiphyseal level and usually more definite on one side than on the other. This gives the best clue to the point of decision as to early treatment."

Frequently with an involvement about the upper end of the femur it is very difficult at times to determine whether the infection directly involves the hip joint or is a primary osteomyelitis of the ileum. The latter infection is uncommon and so far as the hip is concerned, if it is a true epiphysitis, early drainage is also indicated.

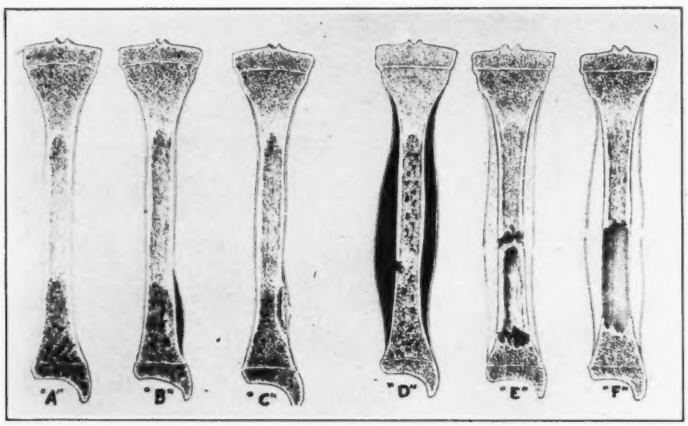


Fig. 2

(A) Note the bacterial emboli lodged in the red marrow of the lower metaphysis. Early opening of the cortex is indicated in this case.

(B) The bacterial infection of the metaphysis has spread and there is a seropurulent effusion beneath the periosteum. Drainage of this without opening the cortex is not sufficient.

(C) In favorable cases, but in a very small per cent, the acute disease localizes and subsides, but a cortical sequestrum will form with or without operation. (See *Figs. 5A and B.*)

(D) This stage follows (B), unless the infection is mild and early drainage of the bone marrow is carried out. Marked purulent infiltration takes place throughout the shaft, the periosteum is widely detached by pus and usually visible perforations of the cortex.

(E) At this state sequestration is present. Note that the tubular sequestration and adjacent cortex are enveloped still by plastic subperiosteal bone.

(F) If the sequestration as shown in (E) is not removed while the involucrum is still plastic the resulting cavity will never be obliterated spontaneously. Its sclerosed walls are no longer capable of osteogenesis. (From International Clinics, 1924, Series 34, 2, 247.)

The radiographic findings in the early stage are always negative. Tragic results have occurred from the delay in waiting for the radiograph to show pathology in acute osteomyelitis (*Figs. 3A, B and C, Figs. 4A, B and C*), whereas, if early proper physical examinations, diagnosis and drainage are made at the proper time, good results are usually accomplished (*Figs. 7A, B and C, Figs. 8A and B*).

Starr further says:

"Early autopsy investigation of these cases of acute general septicemia with local osteomyelitis, a careful study of x-ray findings and experimental studies in animals have established the fact that the infection is carried to the minute capillaries in the diaphyseal end of the large bone from a focus and that it spreads from that point. It has also been demonstrated that the infection spreads most readily along the epiphyseal line to the cortex. It is to be remembered that the cortex at the epiphysis is so thin as to be scarcely recognized as compact bone. It is easy to understand that no barrier is met here to prevent spread to the periosteum. The periosteum being closely attached to the epiphysis beyond the epiphyseal line prevents the spread of infection to the joint: the strip of this membrane from the shaft is away from the joint."

It is obviously seen that the method of treatment of such cases is early adequate drainage of the infected area and the bone, if it is hoped to prevent the spread of infection with the production of generalized septicemia and necrosis of the bone.

Much discussion has taken place in the recent past as to the advisability of early incision and drainage in acute osteomyelitis. There is no doubt that in instances where the patient is dehydrated, very toxic, or severely shocked, an operative delay is indicated for a few hours until blood transfusion and other methods of combating shock can be carried out. It is also a known fact that a certain percentage of cases of osteomyelitis in children will rupture through the periosteum into the soft parts, developing a localized abscess without spreading any further. These cases are rare, but I dare say that those authors who have reported series of cases which have been treated by expectant surgery have been fortunate, especially from the patient's

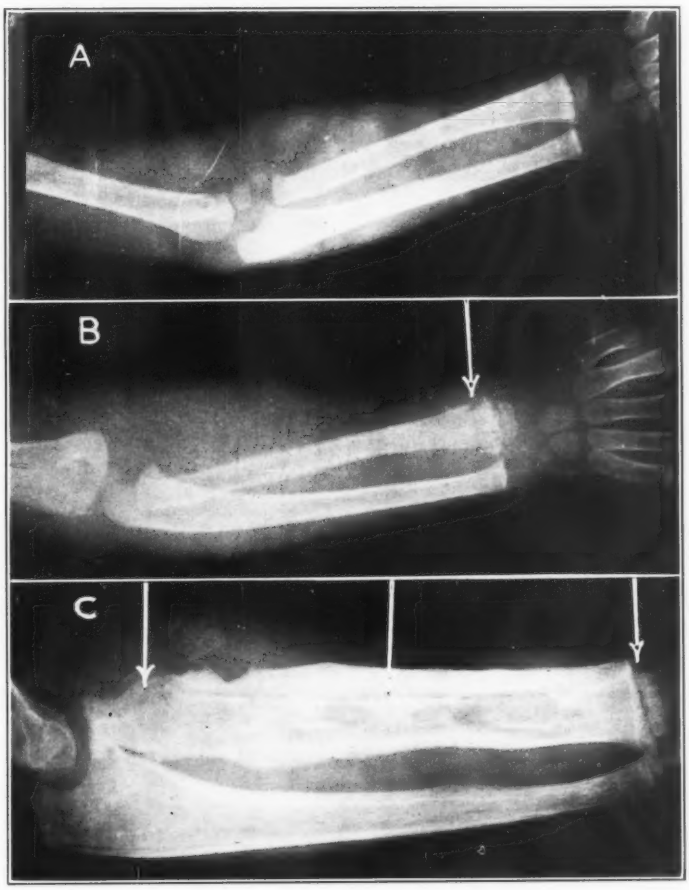


Fig. 3

(A) Patient seen seven days following acute attack of pain and tenderness in the wrist and elbow. History of a fall and developing a septic temperature within twelve hours. Impetigo of forearms. Radiograph was negative. Physical examination showed evidence of osteomyelitis of the lower end of the radius. Incision and drainage and other treatment were carried out as described in the text. A large amount of pus was found.

(B) Radiograph of same case three weeks later, showing bone changes in the lower end of the radius.

(C) Radiograph of same case about one year later, showing marked sequestration which demanded operation. Prolonged disability, but eventual cure. Patient had other metastatic involvement, but without any marked bone changes.

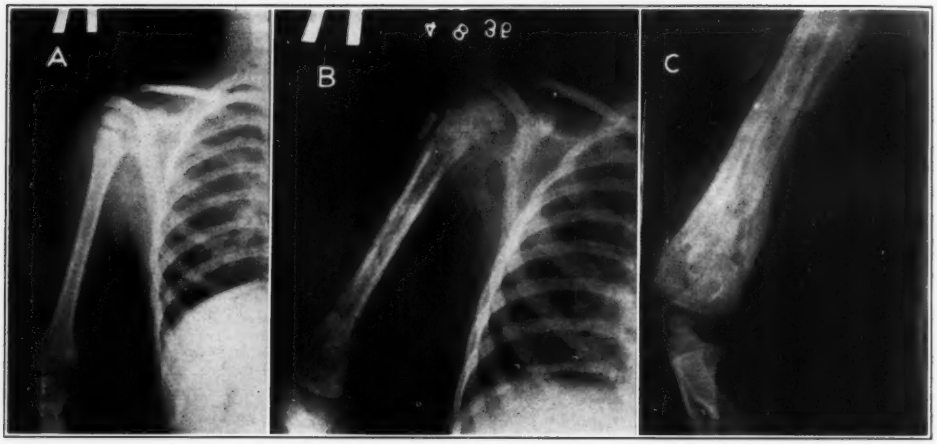


Fig. 4

(A) Radiograph showing a child 12 years old who reported with a diagnosis of rheumatism of the right shoulder. Had been sick for a week, very septic condition, no disease could be made out from the radiograph, but physical examination showed a definite localized osteomyelitis of the upper end of the humerus. Incision and drainage and other treatment were carried out as described in the text. A large amount of pus was found.

(B) Radiograph of same case two months later, showing marked destruction of bone.

(C) Radiograph of same case six months later, showing marked sequestration formation; operative procedure carried out, patient disabled for three years.

standpoint, that their series happened to be of this type.

With the pathologic process of osteomyelitis as outlined by Starr, and the fact that there is a barrier with pus that must be relieved and drained, it is necessary to break down this barrier. It is obviously common sense that drainage is imperative.

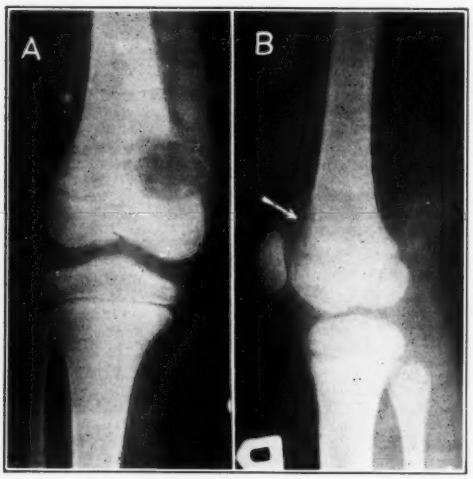


Fig. 5

(A) and (B). Radiograph showing an osteomyelitis of the lower end of the femur in a child 10 years old; same type of case as shown in Fig. 2 (C), with the infection well localized. With incision and drainage through the cortex, good results were obtained with very little sequestration. This type of case is not often encountered.

Provided that all things are equal, the general condition permits and an approximate area of localization has been determined, an incision is made over the most dependent area down to the periosteum. Regardless of whether pus is encountered or not, an incision of the periosteum is made, then drill holes are carried through the cortex to the medullary canal. These drill holes are made to determine the area where pus is present. The drill should be directed toward the epiphyseal line, but should not extend down into it. When pus is encountered, or in many instances no pus is found but a serous fluid is present, a portion of the bone, a window, is removed with a chisel, the amount of bone removed being in proportion to the size of the bone involved; usually about one and one-half by three-fourths inches is sufficient. This window of bone extends down into the medullary canal. In many cases I have failed to get frank pus but a serous exudate which is encountered in most cases in the early stage. Drill holes are not sufficient. They will fill up with granulation and prevent further drainage.

I would rather operate upon a case of mis-

taken diagnosis of acute osteomyelitis than fail to operate upon one which was proven to be an acute case. In only a very small number of our cases operated upon early was there any marked bone changes or metastatic involvements.

Following the drainage, by "windowing" the cortex as outlined, the wound is sufficiently d r a i n e d with rubber tubes and gauze packs, and all points of bleeding should be thoroughly ligated, because every drop of blood is of inestimable value to the patient. Transfusions

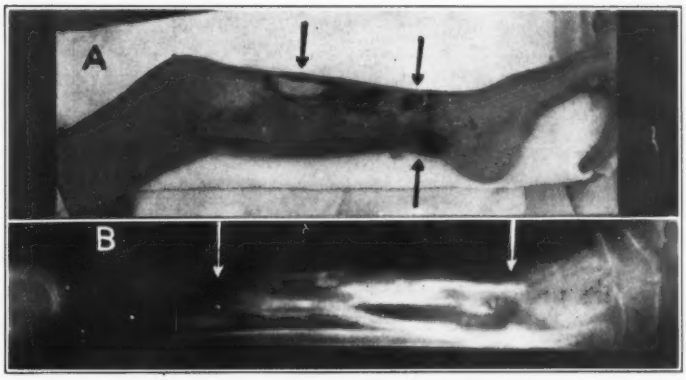


Fig. 6

(A) and (B). Photograph and radiograph showing a neglected case of osteomyelitis of the tibia (left), in a child 7 years old. No operative procedure was carried out. Note the pathologic fracture, the multiple ulcerated areas and the necrotic tibia. The primary infection in this case occurred one year previous to the photograph. The patient was treated not intentionally expectantly but ignorantly expectantly; however, the results are probably the same. It will probably be two or three years before the patient will be able to walk, if then. Early incision and drainage would have prevented such disaster.

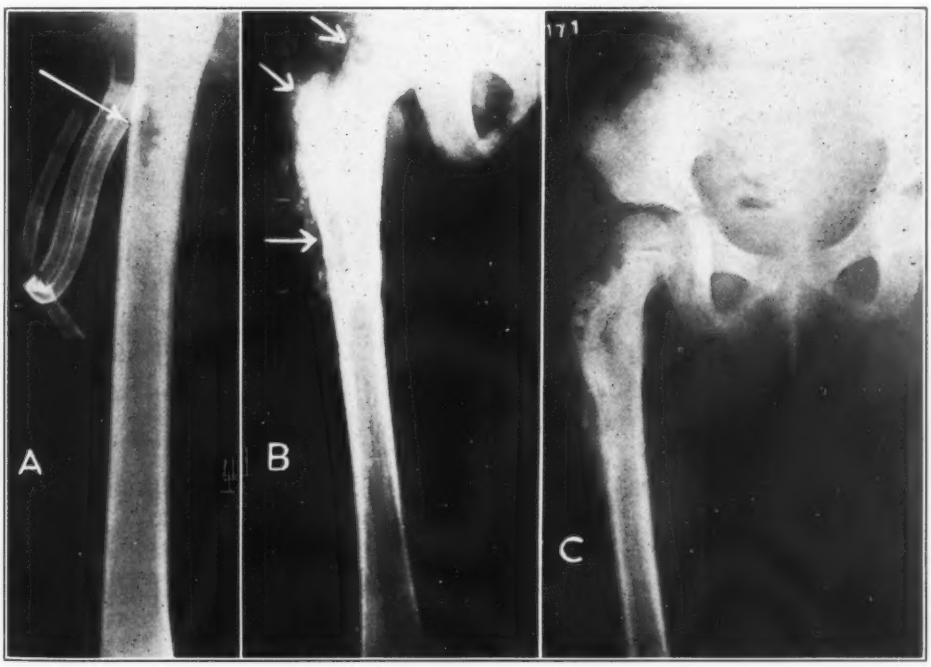


Fig. 7

(A) Negative radiograph of an acute osteomyelitis in a child 10 years old. The case was seen thirty-six hours following onset. The child was very septic. Immediate operative procedure was carried out, cortex opened as will be noted in the radiograph, serous drainage encountered, no pus. Culture showed staphylococci. The patient ran uneventful convalescence, except for slight sequestration which is shown in (B) and (C). There was no metastatic involvement whatever. All wounds healed within three months following the initial infection.

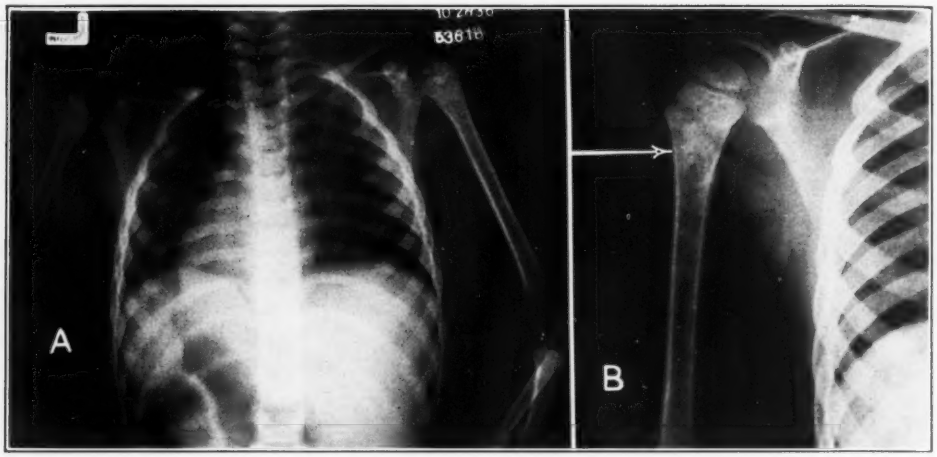


Fig. 8

(A) Child 12 years old, developed sudden pain in left shoulder and septic chill; seen twenty-four hours following acute attack. Radiograph of the left shoulder was negative for any bone disease; however, physical examination showed definite localized pain and tenderness over the upper end of the humerus. Operative procedure as described in the text was carried out and serous drainage obtained, no pus. Culture showed staphylococci. Uneventful convalescence, no bone sequestration as shown in radiograph (B), two months following initial infection.

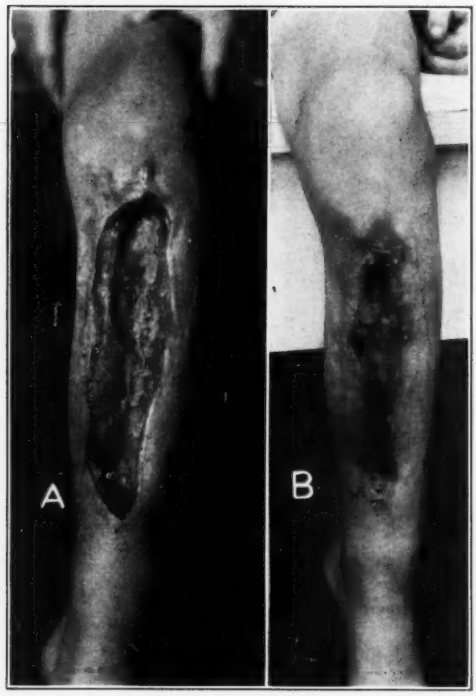


Fig. 9

(A) Extensive osteomyelitis of the left tibia treated by the Orr method, large granulating area resulting, which was treated by deep therapy with rapid improvement as shown in (B).

in such cases are most valuable. In many instances a transfusion should be done before operation and it should be repeated if indicated during the course of convalescence.

Deep x-ray therapy has been used successfully in the convalescent period in certain cases in which there is a large area of granulation which is slow in healing (*Figs. 6A and B*). It is remarkable how rapidly the wound heals following such treatments. In no case, however, should the deep therapy be expected to be of benefit to any bone involvement.

BIBLIOGRAPHY

1. Green, William Thomas: Osteomyelitis in Infancy J.A.M.A., **105**:1835-1939 (Dec. 7) 1935.
2. Starr, Clarence L.: Acute Osteomyelitis. Editorial. Surg., Gyn. & Obst. —:— (May) 1926.

Medical Arts Building

DISCUSSION (*Abstract*)

Dr. Robert W. Johnson, Baltimore, Md.—In discussing Dr. Conwell's paper, I am somewhat hampered by the fact that I am in practically complete agreement with every word he says. It seems strange to me that there can be anyone who questions the advisability of early and adequate drainage in acute osteomyelitis. Certainly pyogenic foci elsewhere are incised and drained, so why should an exception be made in bone, a tissue whose resistance is low and whose absorption after necrosis and whose repair processes are both very slow. Delay gives time for further general toxemia and local necrosis. Certain cases may and do survive temporarily the "expectant" treatment in this as in other infectious diseases, but think of the opportunity thus given

for the formation of metastatic foci and the damage to vital organs from the absorption and toxemia so prolonged. Modern anesthetics have made operative procedures vastly safer for toxic children, so that this one valid contraindication has been voided. Supportive measures during and following operation also play a part in tiding the patient over the immediate shock. Surgery does not in any way interfere with supportive measures such as infusions or transfusions. In fact, in children infusions and transfusions can be given more easily while the patient is narcotized at the same time that the operation is proceeding. I, therefore, entirely second Dr. Conwell's motion toward early surgery and add my earnest support. I know of no better comparison to illustrate the danger of delay than to liken the infection to a stick of dynamite. If it has room to expand it only flares out, while if in a tube of gas piping it goes off with a destructive blast.

LESIONS OF THE FUNDUS OCULI OF SPECIAL DIAGNOSTIC INTEREST*

By GRADY E. CLAY, M.D.
and
J. MASON BAIRD, M.D.
Atlanta, Georgia

Examination of the fundus oculi has become one of the most important aids in the diagnostic field and today no competent internist, neurologist, neurosurgeon, or obstetrician is without an ophthalmoscope. These specialists are fast becoming efficient in the interpretation of various lesions in the fundus, and they criticize us for not recognizing earlier certain ophthalmoscopic changes and for not being able, on the whole, properly to classify such pathologic lesions. When such a man refers a patient to us for examination he is not primarily interested in knowing that the patient has retinal hemorrhages, for he probably already has seen them; he wants a pathologic interpretation of the lesion which will help him in diagnosis and prognosis.

We wish to show fundus photographs of various lesions which are of special interest to the internist, and the types of lesions which should be first discovered by the ophthalmologist.

ANGIOSPASM

Angiospastic conditions are being recognized as the precursor of arteriolar disease and generalized vascular disease; it therefore becomes important that we detect early any existing spasm of the retinal arterioles.

The first photograph shows the type of angiospasm seen in the toxemia of pregnancy. Because we often see pregnant women soon after toxemia develops, it is in this group that we most frequently recognize angiospasm. Angiospasm may occur from any other toxic disturbance such as an acute infection or acute glomerulonephritis. It is probably the earliest change in the fundus of benign or malignant essential hypertension, as well as in that of the hypertension which may follow acute nephritis. We have seen localized spasm occurring in the retinal vessels around an acute choroidal lesion, and this is probably what happens in the kidney in acute nephritis. Of course, such a localized arteriolar spasm does not lead to generalized vascular disease.

Angiospasm is not always easily recognized, especially if it be general, but frequently it is accompanied by irregularity in the lumen of the vessel near the disc border and most often (Wegener states) of the nasal vessels. There is no other visible alteration in the vessel at this stage and the spasm is likely to vary from day to day. In such cases the whole arteriolar system is affected thus involving the brain, kidney, pancreas and liver, so we must be on the lookout for angiospasm. Organic changes in the arterioles are said to occur after ten days, so to allow angiospasm to continue for any length of time is to allow permanent damage to be

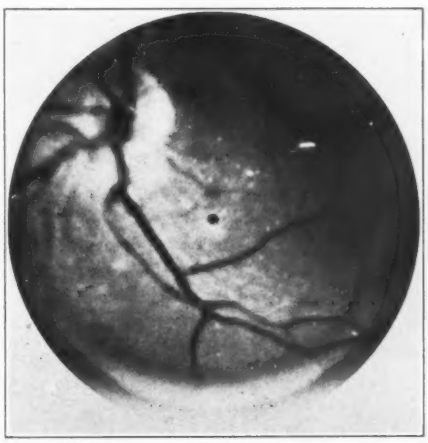


Fig. 1
Angiospasm. From a case of toxemia of pregnancy. Spasm of the inferior temporal artery.

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association. Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

done. Since angiospasm will clear up as soon as the toxemia has been eliminated, when it occurs in the toxemia of pregnancy, the uterus should be emptied.

Edema, hemorrhages and exudates in the fundus are said by some to be due primarily to arterial disease. When these begin to make their appearance, definite organic change is developing in the wall of the arteriole. Such lesions lead to hypertension though there are permanent changes in many cases in which arterial tension returns to normal after the acute toxemia is relieved. Probably the rest of the vascular system compensates for this change. At any rate when we see such changes in the arterioles we can say that that patient has or has had hypertension.

Angiospasm may occur in a previously arteriosclerotic, or a senile arteriosclerotic vessel. We recently saw a complete angiospasm which had the appearance of an embolus of the central artery in a man 75 years of age, who has for years had a marked senile sclerosis. The spasm largely cleared up within 72 hours, and he is now having probably cerebral spasm manifested by temporary aphasia, lapses of memory and hyperemotionalism.

The etiology of arteriolar spasm is not known. The only logical explanation, however, seems that it must be vasomotor and is probably due to stimulation of the centers located in the hypothalamus.

HYPERTENSION

Of recent years essential hypertension has become recognized as by far the most common type of hypertension. Since it is largely a disturbance of the smaller arteries and arterioles, the study of the fundus oculi gives us most important information in the diagnosis and a definite picture of the pathologic process.

The earliest pathologic change in essential hypertension is angiospasm of the arterioles and at this time the ophthalmoscopic examination would be of the most diagnostic help. It is at this early stage that the patient consults an ophthalmologist complaining of headaches, and the angiospasm is frequently overlooked because we are not careful enough to observe the early vascular changes. Such a patient with severe hypertensive disease may be delayed many months before reaching the internist. Unless a very careful examination of the whole vascular tree of the retina is made, many of these conditions will be overlooked.

Essential hypertension is characterized by a high systolic pressure and a diastolic pressure usually over 100 mm. of mercury. In most cases the disturbed function is confined for years to the heart, brain and eye; there is usually no renal involvement until late in the diseases. This disease is usually first recognized in the early forties, though it may be seen in young adults and extreme old age.

Essential hypertension is divided into two types, benign and malignant. Most authors agree that the two types simply indicate a difference in severity while others argue that from a clinical and pathologic standpoint they appear to be distinct entities. Benign hypertension comprises the larger group and the fundus changes are first confined to the arterioles. *Fig. 2* illustrates the changes characteristic of benign hypertension. The vessels appear smaller, usually without much change in caliber. Later a broadening of the reflex stripe and arteriovenous compression are noted. Small flame-shaped hemorrhages may occur early but this appearance of hemorrhages, exudates and edema of the nerve head and retina are not common until late in the disease. These patients may

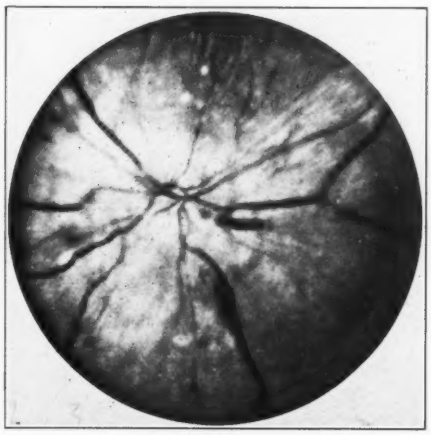


Fig. 2

Benign essential hypertension. Grade 3 retinal arteriolar sclerosis, exudates, flame-shaped hemorrhages, slight edema of the nerve head and retinae.

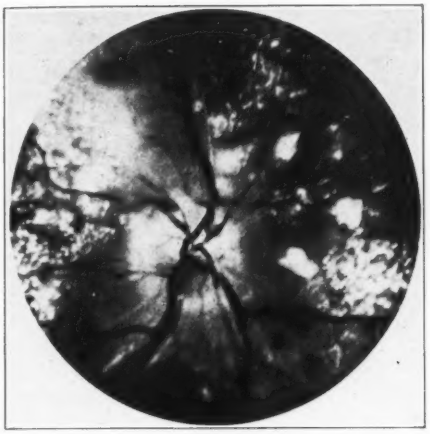


Fig. 3
Malignant hypertension. Marked arteriolar sclerosis, severe edema of the nerve head and retina, and pronounced exudates.

live for years without even knowing they have hypertension. They are much more likely to develop cerebral than renal complications.

In malignant hypertension, the blood pressure is always much higher; the systolic may go over 300, the diastolic to 180. The course is much more rapid and the patient is not likely to live over a year. A typical picture of the fundus is seen in *Fig. 3*. The changes are severe and rapid in their development. The first is marked angiospasm with great irregularity in the caliber of the vessels. There is then rapid development of permanent and progressive arteriosclerotic changes, and soon marked hemorrhages and exudates in the retina, and edema of the nerve head and retina appear. The swelling of the disc may reach 5 or 6 diopters. This papilledema has been considered the result of intracranial pressure. We doubt this, however, since the degree of edema in the retinae may be proportionately as great. We are convinced that some of the severe changes seen in the fundus are not due to the vascular disease but rather a manifestation of a toxemia probably arising from dysfunction of the kidneys and liver. Certainly such arteriolar disease could not exist without causing severe damage to these organs. Of course, the development of star-shaped lesions in the maculae is no longer attributed to kidney disease: it may be associated with any process which produces marked edema of the maculae. The end results of the changes in the fundus is a consecutive optic atrophy and endarteritis obliterans.

SUBARACHNOID HEMORRHAGES

Subarachnoid hemorrhages produce a picture that is diagnostic. The nerve head rapidly develops a most marked edema. This swelling can be seen to increase every few hours, and the striking feature is the development of large hemorrhages over the nerve head extending into the retina. Frequently these hemorrhages will extend into the vitreous. Occasionally subhyaloid hemorrhages will be seen. The degree of swelling of the nerve head is dependent more upon the amount of hemorrhage than its location. The choking of the disc is produced by increased intracranial pressure and blood in the optic nerve sheath obstructing the flow of blood and lymph. The occurrence of such massive hemorrhages as we see in the fundus has not been definitely explained, although Goulden sectioned such an eye and disputed the theory that such hemorrhages developed by seepage. He believes that the hemorrhages come from the central vein as the result of the marked obstruction to the venous return.

The fundus lesion is always bilateral, but the degree of swelling may vary on the two sides.

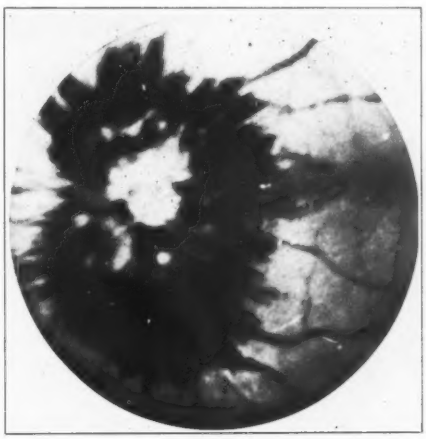


Fig. 4
Subarachnoid hemorrhage. Choked disc with marked hemorrhages over the nerve head extending out into the retina. A similar condition was found in the other eye.

Most of these patients die. Those patients who survive have a consecutive optic atrophy depending upon the duration and degree of swelling of the optic nerve.

OPTICO-VAGINAL HEMORRHAGE

Optico-vaginal hemorrhage, we do not believe, is as rare as the literature would lead one to believe. *Fig. 4* shows a typical case at the height of the swelling 24 hours after the hemorrhage. *Fig. 6* is of the same fundus four months later. It is practically a normal picture except for a slight gliosis. The fundus picture of optico-vaginal hemorrhage is identical with that of subarachnoid hemorrhage except that it is always unilateral. This picture can never be confused with any other disease. One might possibly think of thrombosis of the central vein, but the swelling of the nerve head being so great and the hemorrhage being confined to the disc and a small area around it should make the diagnosis clear.

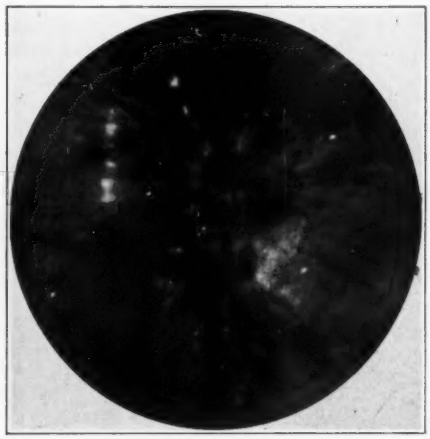


Fig. 5
Optico-vaginal hemorrhage. A choked disc with marked hemorrhage over the nerve head and retinae. This condition was unilateral.

The symptoms are acute: a rapid loss of sight and some pain on moving the eye. The return of sight is very slow and if the swelling has been great the eye may remain sightless from a consecutive optic atrophy.

OPTIC NEURITIS

Optic neuritis is always an interesting disease. This report is preliminary to the report of a large group we plan to present in the future. *Fig. 7* is a typical example. Characterized by sudden loss of central vision or complete blindness with usually a high degree of swelling, it is the most serious, as it usually leads to a rapid consecutive optic atrophy and

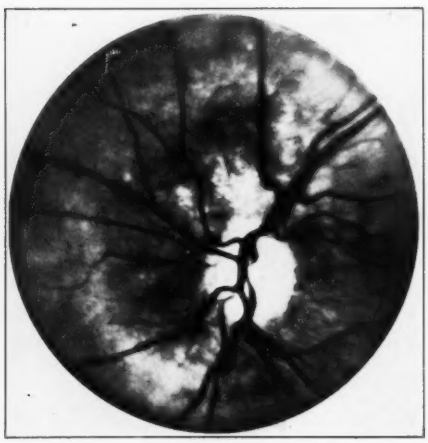


Fig. 6
Optico-vaginal hemorrhage. Fundus as seen three months after the hemorrhage. Practically normal. Same case as Fig. 5. Vision has returned to 20/30.

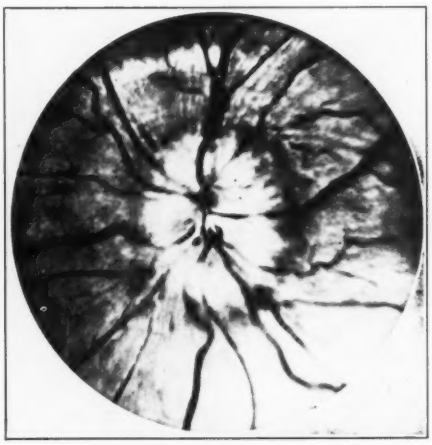


Fig. 7
Optic neuritis. Swelling of the nerve head, 5 diopters. No engorgement of vessels.

therefore partial or complete blindness. It is often erroneously called retrobulbar neuritis.

Optic neuritis may occur in sinus disease and in such cases is usually unilateral. It may also occur with any other focal infection or in severe cases of acute syphilis of the central nervous system.

The most interesting and unexplained group is that which we are seeing more frequently now in children from 10 to 18 years of age principally. This type is characterized likewise by a sudden central or complete blindness. The swelling of the nerve head varies, in some cases barely a visible swelling while in others the nerve head may be swollen 6 or 7 diopters. Such cases can be easily confused with choked disc, but the sudden blindness and lack of engorgement of the veins and the appearance of the nerve head should clear up the diagnosis. The swelling may subside within two weeks to a few months, but there is always a certain degree of consecutive optic atrophy and in many cases blindness.

Optic neuritis of this type has had no explanation and the cases which we have seen and studied have been in healthy children in whom careful diagnostic studies revealed nothing else wrong. This type of optic neuritis closely resembles in every way the types seen in some cases of encephalitis, but more especially in neuromyelitis optica. We therefore believe it is an inflammatory process produced by a virus infection which has a specific affinity for the optic nerve.

The treatment of these cases is most important because of the usually disastrous end results. Every patient should be put to bed immediately after the diagnosis is made and kept in bed until the swelling has subsided. Foreign protein therapy is our best hope at present and a protein should be used which gives a good reaction. We prefer typhoid intravenously.

In this paper we have presented only a small group of interesting fundus diseases, but they forcefully remind us of the important part ophthalmology plays in the diagnostic field. It is important for us to have a better understanding of these various pathologic processes, so that we can properly interpret the lesions seen in the fundus oculi.

THE TREATMENT OF MYASTHENIA GRAVIS*

By SAMUEL S. RIVEN, M.D.
and
MORTON F. MASON, PH.D.
Nashville, Tennessee

Within the past five years several so-called specific forms of therapy have been advocated in the management of myasthenia gravis. The purpose of this report is to present observations made on three patients who have had the benefit of these newer forms of treatment.

The pathogenesis of myasthenia gravis is still not understood. The most constant findings at autopsy are lymphorragic infiltrations in the muscles. In some cases there are degenerative changes in the muscles with irregular atrophy of individual fibers.[1] Degenerative changes in the nervous system are not consistently encountered. The early literature concerning the pathological findings has been summarized excellently by Boothby.[2] The claims of Rosenow and Heilman[3] and of Butt[4] that streptococcal infection is a factor needs further confirmation. Despite the fact that almost 50 per cent of the patients with myasthenia gravis are said to show abnormalities of the thymus,[5,6] there is no conclusive evidence that disturbances in the function of this gland are related to the disease.

Myasthenia gravis is usually attended by a moderate creatinuria which suggests that there is some alteration of the metabolic processes in muscles. However, Nevin[7] has shown that there are no demonstrable qualitative chemical changes involved. Recently Friesz and Marno[8] reported alterations in the metabolism of lactic acid in myasthenia gravis and in some instances these were corrected by administration of the synthetic drug "prostigmin." Pritchard[9] states that the transmission of nervous impulses is impaired in myasthenia gravis. This view is based on the responses of myasthenic muscles to electrical stimulation of motor nerves and to the administration of physostigmin and its derivatives. Whatever the cause of myasthenia gravis is, it is difficult to escape the conclusion that it resides in a pathologic process which is peripheral

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Medicine and Biochemistry, Vanderbilt University School of Medicine, Nashville, Tennessee.

to the ventral horn cell and which probably involves the myoneural junction.

In spite of the fact that the pathogenesis of myasthenia gravis is not clear, certain therapeutic advances have been made. Progress in this respect has been hindered by difficulties in evaluation of treatment because of the frequency of spontaneous remissions in this disorder. It is agreed that symptomatic therapy is helpful in all stages of the disease. Numerous reports have dealt with the beneficial effects of the administration of amino acids, especially glycine.[10] However, there is little to suggest that either the progress of the disease is arrested or that there is permanent improvement following the use of amino acids. The occasionally striking benefits observed may be due to the specific dynamic action of such substances or to the onset of a spontaneous remission of symptoms.

The discovery by Edgeworth[11 12] of the favorable action of ephedrine has been confirmed by Boothby and others, and there is no doubt that it temporarily relieves mild and occasionally severe symptoms.

The finding of Laurent and Walther[13] that the administration of potassium chloride is of therapeutic value needs further confirmation. If potassium enhances the excitability of the myoneural junction,[14] it seems likely that it would be beneficial in myasthenia gravis even though there is no demonstrable disturbance of potassium metabolism in this disease.

The recent discovery by Walker[15 16] of the dramatic response of patients with myasthenia gravis to physostigmin and its derivatives has yielded still another therapeutic approach. The synthetic analogue "prostigmin" was found by Walker to be a most satisfactory compound for parenteral use.* A few minutes after its administration the symptoms of dysarthria, dysphagia, ptosis, diplopia and general muscular weakness are largely or entirely abolished for a period of from three to seven hours. These effects are obtained with doses which do not produce toxic symptoms and which, in our experience, may be repeated frequently without untoward results.

Physostigmin has been the subject of numerous pharmacologic and physiologic investigations. Edmunds and Roth[18] observed its effect on muscle and found this to be separate from its action on the intestine and other organs innervated by the parasympathetic system. It has also been shown that physostigmin antagonizes curare in the peripheral nerve muscle preparation,[19] and Lindsley (quoted from Rosenblueth, Lindsley and Morison[20]) believes that myasthenic neuromuscular systems behave like incompletely curarized systems. It has been suggested that physostigmin prevents the destruction of acetyl cholin by cholin esterase at the motor nerve ending. Cooke and Passmore[21] determined the cholin esterase activity of the serum, whole blood and blood corpuscles of one of their patients and found it to be within normal limits. Similar findings are reported by Hyland.[22] Pritchard[9] suggested that the muscular weakness of myasthenia was probably due to a failure of transmission of excitation from motor nerves to voluntary muscle and presented ergographic records to demonstrate that administration of "prostigmin" to patients with myasthenia gravis restored this function. Whatever the precise action of "prostigmin" is, it seems certain that it facilitates the tranmission of nervous impulses through the myoneural junction. It is significant that the use of "prostigmin" is of little benefit in muscular distrophy and muscular atrophy and because of this its use as a differential diagnostic test has been suggested by Viets and Schwab.[23]

CASE REPORTS

Case 1.—M. O., a 32-year-old white housewife, was admitted to Vanderbilt University Hospital on April 24, 1935, complaining of weakness. This symptom was first noticed two years before and was most marked in her legs. At that time she was told she had myasthenia gravis. Fifteen months later treatment had been started with ephedrine and glycine and there was improvement in her symptoms. Three months prior to admission, in spite of treatment, she experienced a relapse which was characterized by inability to rise readily from a chair, fatigue associated with combing her hair, eating and talking. In addition she experienced diplopia when tired and found that a distinct effort was required in order to smile. She also noticed coldness of her extremities.

Her general health had been good. She had a tonsillectomy in 1932. She had been married five years without pregnancy.

The patient was large, well developed and well nourished. The face was smooth and there was weakness of all facial muscles and ptosis of the eyelids, and the

*Prostigmin, the dimethyl carbamic ester of 3-oxyphenyl-trimethyl-ammonium-methyl sulfate, is a proprietary compound. It was first synthesized by Aeschlimann and Reinert,[17] who also reported some of its pharmacological properties. It is dispensed in 1 c. c. ampoules containing 0.002 gm. for intramuscular injection. When employed in this manner, 0.0004 gm. of atropine sulphate is also given to decrease the stimulating action of "prostigmin" on the gastro-intestinal tract. More recently the compound has been prepared in tablet form (30 mg.) for oral administration and when it is so used atropine need not be given.

power of the muscles of the jaws, neck and limbs was deficient. Her speech was slightly nasal and she had some difficulty with enunciation. The pupils reacted promptly to light and accommodation. The left pupil was larger than the right. The extra-ocular movements were well performed. The ophthalmoscopic examination was normal. Examination of the heart and lungs revealed no abnormalities. The blood pressure was 112/88. The examination of the abdomen revealed a small fibromyoma of the uterus. Muscle strength was generally impaired. Weakness was not limited to any extremity or to any muscle group, but was generalized. She was unable to sit up in bed without the use of her arms. Her hand grip was good when first tested, but tired quickly and was quite feeble after twenty seconds. There was no muscle atrophy and fibrillary twitchings were not observed.

Laboratory Data.—The urine was normal. The red blood cell count was 5,800,000; hemoglobin 14.8 gm. per cent. The white blood cell count was 8,000. The Wassermann and Kahn tests were negative. The blood nonprotein nitrogen was 26 mg. per cent. The serum protein was 6.7 gm. per 100 c. c. with a normal albumin-globulin ratio. The fasting blood sugar was 77 mg. per cent. Thirty minutes after 100 gm. of glucose it was 154 mg. per cent; after 1 hour, 2 hours, and 3 hours it was 118, 102 and 54 mg. per cent, respectively. There was a slight trace of sugar in the half hour and one hour urine specimens. The basal metabolic rate was minus 16 per cent. After several days on a creatine-free diet, examination of the urine for creatine revealed an irregular creatinuria. The amount of creatine varied from 30 to 70 per cent of the total creatine plus creatinine output.

Upon the administration of "prostigmin" (1 c. c.) and atropine sulphate (0.0004 gm.) intramuscularly, she exhibited improvement in speech, facial expression and general muscular power which lasted about four hours.

Roentgenograms of the chest gave no evidence of a thymic tumor. Electrocardiograms were normal.

In view of the findings recorded above, the preadmission diagnosis of myasthenia gravis was confirmed.

On April 24, 1935, rest and creatine-free diet were instituted. From May 1 to May 7, 1935, she received "prostigmin" (1 c. c.) and atropine sulphate (0.0004 gm.) intramuscularly daily. Ergographic tracings obtained before and at varying periods after each administration of these drugs showed that there was definite transient improvement in muscular strength. "Blank" injections of saline were used as controls. Because the patient's judgment regarding subjective improvement was thought to be somewhat unreliable, she was provided with ampoules of "medicine" and sent home to have one daily intramuscular injection. The patient believed she was to receive "prostigmin" when in fact she was given ampoules of normal saline. She returned on June 4, 1935, with the same symptoms she had presented at her previous admission. Upon receiving "prostigmin" (1 c. c.) at this time all the symptoms were temporarily relieved. This test was repeated on three successive days with similar results. "Prostigmin" was then withheld and ephedrine (0.025 gm.) three times daily for six days was prescribed. Her myasthenic symptoms reappeared. On June 16, 1936, she was sent home and advised to take 15 gm. of glycine daily for one month. She returned to the hospital on July 15, 1935, with symptoms much the

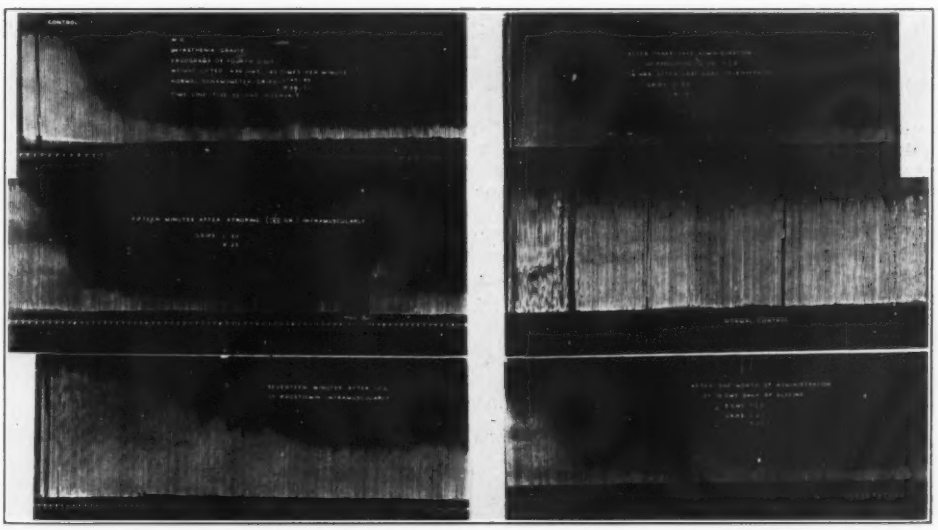


Fig. 1

Figs. 1 and 2.—Patient M. O. Ergographic tracings by fourth digit. Weight lifted: 430 gm., 40 times per minute. Grips obtained with dynamometer. Normal grips (women): right hand 50 to 70, left hand 45 to 65. Time line 5 second intervals. Tracings read top to bottom.

Fig. 1.—(1) Control (patient). (2) Fifteen minutes after atropine (1/150 gr.) intramuscularly. (3) Seventeen minutes after 1 c. c. of "prostigmin" intramuscularly. (4) After three days' administration of ephedrine (3/8 gr. t. i. d.), 16 hours after last dose. (5) Normal control ergogram. (6) After one month of glycine administration (5 gm. t. i. d.).

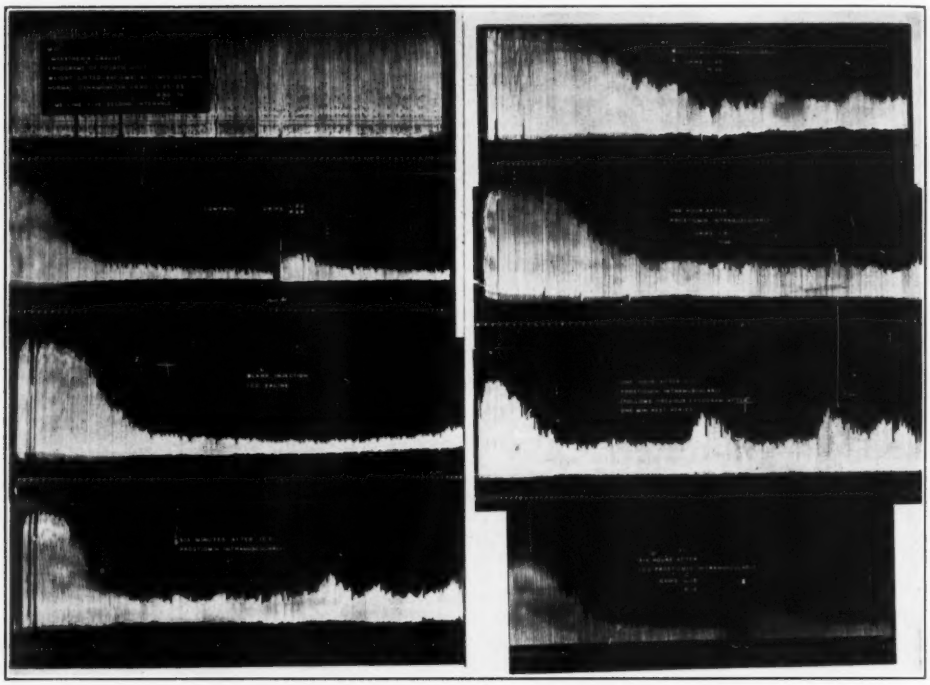


Fig. 2

Figs. 1 and 2.—Patient M. O. Ergographic tracings by fourth digit. Weight lifted: 430 gm., 40 times per minute. Grips obtained with dynamometer. Normal grips (women): right hand 50 to 70, left hand 45 to 65. Time line 5 second intervals. Tracings read top to bottom.

Fig. 2.—(1) Normal control. (2) Control (patient). (3) After 1 c. c. of saline intramuscularly. (4, 5, 6-7, 8) Six minutes, twenty-five minutes, one hour and six hours, respectively, after 1 c. c. "prostigmin" intramuscularly.

same as those presented at the first admission. Ergographic tracings indicated that there had been no improvement. For four successive days, she received injections of saline which she was led to believe were "prostigmin." There was no response to these injections. Three successive intramuscular injections of atropine sulphate (0.0004 gm.) were also ineffective except for a mild flushing of the skin. On July 25, 1935, the administration of "prostigmin" and atropine was resumed. Improvement was marked within a few minutes after each injection and the effect lasted for six hours. Blood pressure determinations at frequent intervals after the injections showed a transient fall of only a few millimeters in both systolic and diastolic pressure. On July 27, 1935, she returned home with instructions to continue the administration of "prostigmin" (1 c. c.) and atropine sulphate (0.0004 gm.) daily. She returned August 24, 1935, and reported that she was feeling well, that her vision had improved and that she could talk, chew and swallow without embarrassment. At this time she was advised to add ephedrine sulphate (0.025 gm.) once daily to her treatment. She has continued to feel well except for brief intervals of myasthenic symptoms following voluntary discontinuation of "prostigmin." Ergographic studies of this patient are shown in *Figs. 1* and *2*.

Case 2.—J. H., a 20-year old white school girl, was admitted to Vanderbilt Hospital on December 28, 1935, for the fifth time. Her illness began in February, 1932, and in February, 1933, the diagnoses of myasthenia gravis and tumor of the thymus was made.* From 1932 to 1935 the course of her disease was characterized by exacerbations in February of each year followed by gradually developing remissions extending through the summer, fall and early winter months. In 1935 relapse occurred in December. At this time she complained of progressive weakness, ptosis of the eyelids, diplopia, indistinct vision, and difficulty in talking, chewing and swallowing. The return of these symptoms had been gradual.

Her general health had been excellent. She had had a tonsillectomy at the age of 5 and malaria in 1929.

The patient was a well developed, pale individual who was mentally alert and very cooperative. The facial expression was languid, partial ptosis of the eyelids was present and speech was slow and slurred. The pupils reacted to light and accommodation; the fundus examinations were negative. The visual acuity and visual fields were normal, as were the extra-ocular

*We are indebted to Dr. Hugh Morgan for the opportunity of including this patient in our report.

movements. The left side of the face was smoother than the right, and the mouth was drawn to the right. The masseter muscles contracted only moderately well. The right hand grip was weaker than the left, and both became exhausted quickly. The muscular strength of the trunk and lower extremities was readily exhausted. Her blood pressure was 125/70.

Laboratory Data.—The urine was normal. The red blood cell count was 4,500,000; hemoglobin 12 gm. per cent. The white blood cell count was 8,400 and the differential count was normal. The serum calcium was 10.8 gm. per cent and the serum inorganic phosphate was 2.7 mg. per cent. The urea nitrogen was 17 mg. per cent. The fasting blood sugar was 69 mg. per cent. Thirty minutes after ingesting 75 gm. of glucose it was 125 mg. per cent. Sixty minutes, two hours and three hours later it was 143, 140 and 118 mg. per cent, respectively. On a creatine-free diet the patient exhibited a creatinuria amounting to 18 per cent of the total creatinine plus creatine output. Dynamometer tests revealed considerable weakness of the hand grips.

Electrocardiograms were normal. Roentgenograms of the chest showed a shadow in the region of the thymus somewhat larger than that observed on previous admissions. In the lateral view the shadow extended down to the junction of the manubrium and the body of the sternum.

On December 28, 1935, the patient was given glycine (5 gm.) and ephedrine (0.025 gm.) three times a day for the three days. The drugs were then discontinued for the purpose of subsequently testing the effect of "prostigmin." Before administering the latter drug a control injection with normal saline was employed. This was repeated on three successive days and was without effect. Ergographic tracings and dynamometer records were obtained and revealed no improvement. On January 4, 1936, her condition became alarming. She developed marked weakness of all the muscles of her face, limbs and trunk, experienced great difficulty in chewing and swallowing, and her voice was so weak and nasal that she could not be understood. "Prostigmin" (1 c. c.) and atropine sulphate (0.0004 gm.) were injected subcutaneously. Within fifteen minutes striking improvement was observed in the muscles of the face and limbs. For more than an hour her facial muscles behaved in almost normal fashion and her voice was strong and clear, although still slightly nasal. She could walk with ease. During this time ergographic tracings and dynamometer readings were obtained (*Fig. 3*). They showed marked improvement over previous tests. She was able to eat without difficulty. Three hours later, however, her condition had become the same as before the injection. By January 10, 1936, it was found that a single daily dose of "prostigmin" and atropine was not sufficient to control the symptoms and glycine (5 gm.) and ephedrine (0.025 gm.) three times daily were added. This proved insufficient, and by January 15, 1936, it was found necessary to give "prostigmin" subcutaneously at night to avoid the aspiration of saliva. The increasing severity of her symptoms required the administration of more frequent doses of "prostigmin" and finally she was taking as much as 9 c. c. in 24 hours. On this regime she was able to take a diet of 2,000 calories and 3,000 c. c. of fluids.

On the morning of January 31, 1936, the patient felt she could do without the 5:00 a. m. dose of "prostigmin." At 7:15 a. m. her nurse found her extremely cyanotic. Respirations were barely perceptible, she had vomited, and was incontinent. She was given "prostigmin" (1 c. c.) and artificial respiration. After ten minutes normal breathing had resumed.

On February 7, 1936, in addition to the continued use of glycine, ephedrine and "prostigmin," it was decided to irradiate again the region of the thymus. She had had four courses of x-ray irradiation during previous stays in the hospital. After another course of four treatments there was no decrease in the size of the mediastinal shadow, and no immediate improvement in the symptoms.

By March 10 the patient had begun to exhibit evidence of sustained improvement. As this developed the dosage of "prostigmin" was gradually reduced. Within a period of six weeks she was able to be out of bed and about her room all day without the use of the drug. She had gained in weight and in strength and had obviously attained a good remission. She was discharged from the Medical Service May 25, 1936.

Case 3.—W. M. C., a 22-year-old white housewife, was admitted to Vanderbilt University Hospital on February 7, 1936, complaining of difficulty with talking and swallowing. These symptoms were first noticed two years before. She had found that she could not read a newspaper aloud because her voice tired rapidly. Her lips often felt numb and she was unable to purse them. The difficulties in chewing progressed with each meal; swallowing required increased effort, and there was often regurgitation of fluids into her nose. She had lost 25 pounds in weight. She stated that her left arm was weak; nevertheless she had continued to do her housework as usual, although she frequently desired to lie down in the afternoon. She stated that symptoms were intermittent and that there had been several periods of two or three months in which they had entirely disappeared.

She had malaria in 1926, an appendectomy in 1928, and influenza in 1933. She had never been pregnant.

The patient was a short, slightly obese, and normally developed woman. She did not have the myasthenic facies. Her voice was nasal and after conversing a few minutes, it became weak and indistinct. There was no ptosis of the eyelids, but the orbicularis oculi muscles were definitely weak. The pupils reacted normally to light and accommodation. The left pupil was larger than the right. The ophthalmoscopic examination was normal. The uvula moved poorly and the gag reflex was absent. Phonation was difficult. The tonsils were moderately enlarged; the tongue protruded in the middle line without excessive tremor. There was facial weakness, especially on the left, but this was not apparent until she smiled. After repeated movements there was some weakness of the facial muscles on the right. She was unable to purse her lips to whistle. There was slight weakness of the muscles of mastication, particularly the pterygoids. The muscles of the extremities and trunk showed fairly good strength with the ordinary tests, and did not exhibit any abnormal fatigability. The heart and lungs were normal. The blood pressure was 100/80. Examination of the abdomen was negative.

Laboratory Data.—The urine was normal. The red blood cell count was 4,260,000; hemoblobin determina-

tion 13.5 gm. per cent. The white blood cell count was 7,650, and the differential count was normal. Wassermann and Kahn tests were negative. The basal metabolic rate was normal. The blood non-protein was 27 mg. per cent. The blood sugar was 87 mg. per cent. A roentgenogram of the chest was normal. A moderate creatinuria persisted after the patient had been placed on a creatine-free diet.

The diagnosis was myasthenia gravis.

She was kept at rest in bed for a period of three weeks. On February 26, 1936, glycine (5 gm.) and

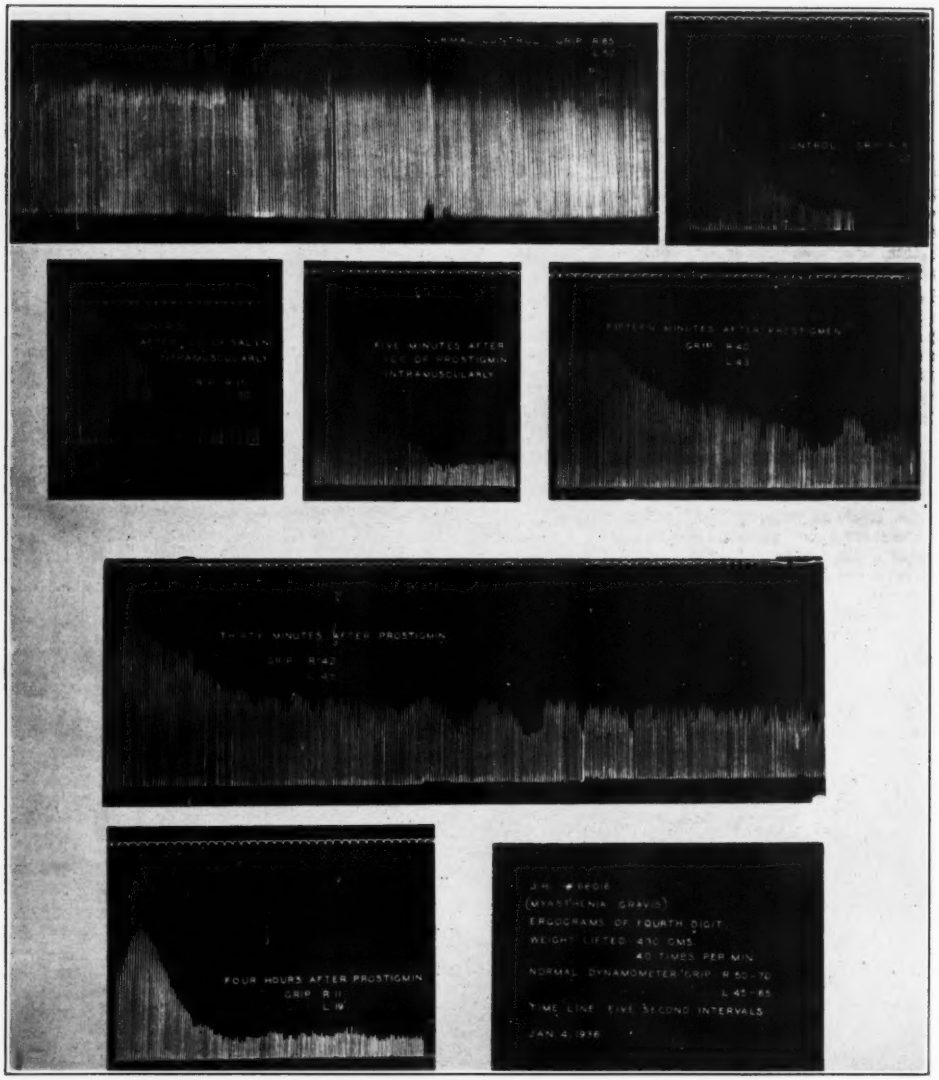


Fig. 3

Patient J. H. Erographic tracings by fourth digit. Weight lifted: 430 gm., 40 times per minute. Grips obtained with dynamometer. Normal grips (women): right hand 50 to 70, left hand 45 to 65. Time line 5 second intervals. Tracings read top to bottom.

Tracings read from left to right, top to bottom. (1) Normal control. (2) Control (patient). (3) After 1 c. c. of saline intramuscularly. (4, 5, 6, 7) Five, fifteen, thirty minutes and four hours after 1 c. c. "prostigmin" intramuscularly, respectively.

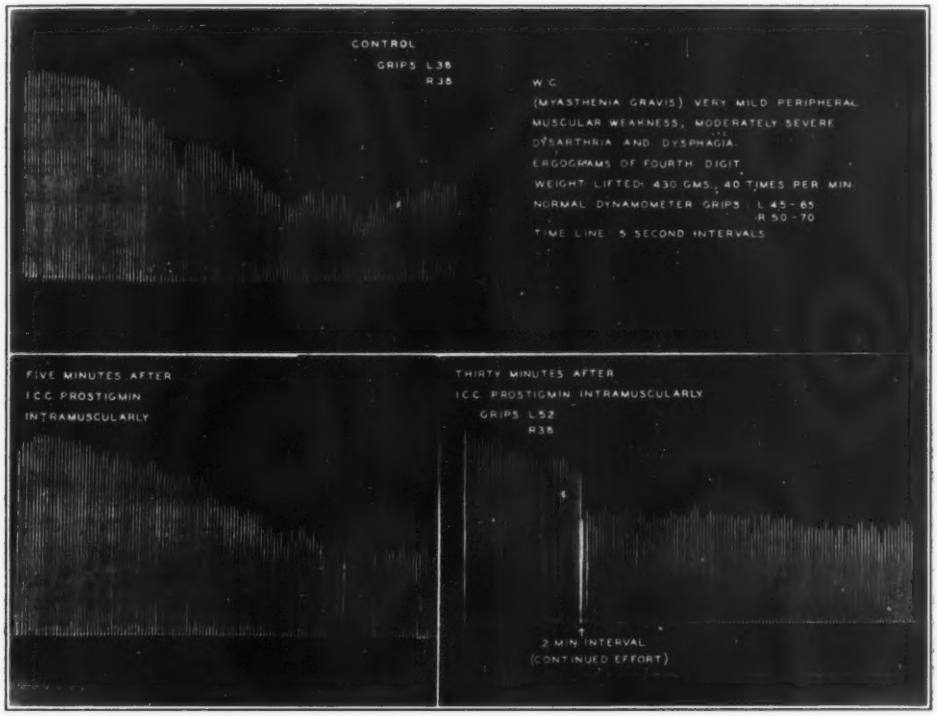


Fig. 4

Patient W. C. Ergographic tracings by fourth digit. Weight lifted: 430 gm., 40 times per minute. Grips obtained with dynamometer. Normal grips (women): right hand 50 to 70, left hand 45 to 65. Time line 5 second intervals. Tracings read top to bottom.

Tracings read top to bottom, left to right. (1) Control (patient). (2, 3) Five and fifteen minutes after 1 c. c. "prostigmin" intramuscularly, respectively.

ephedrine (0.03 gm.) three times a day were prescribed. During the next 10 days considerable improvement occurred. She could eat her meals without difficulty and her voice was stronger. On February 27, 1936, "prostigmin" (1 c. c.) with atropine sulphate (0.0004 gm.) were given intramuscularly. Within twenty minutes her voice became stronger. She was able to count up to 150 without fatigue and to drink two glasses of water without regurgitation. Ergographic tracings were taken during this period, but revealed little change from previous tests (*Fig. 4*); however, improvement in bulbar symptoms lasted three hours. She remained in the hospital until March 6, 1936, during which time she received glycine and ephedrine and upon discharge was advised to continue taking these drugs.

She returned to the hospital on March 30, 1936, because her symptoms had recently increased in severity. She also had noticed a small mass just below the hair line on the left forehead. This was found due to osteomyelitis of the left frontal bone. Operation was performed by Dr. Cobb Pilcher. The patient stood the procedure well and obtained complete relief from the infection. "Prostigmin" (2 c. c.) and atropine sulphate (0.0004 gm.) t.i.d. were prescribed preoperatively and postoperatively in addition to the glycine and ephedrine which she had been taking.

The administration of "Prostigmin" was continued until April 5, 1936, when her improvement seemed to warrant its withdrawal. At this time mono-sodium glutamate was substituted for glycine in the same dosage.* This amino acid was tolerated as well as glycine, although the patient complained somewhat of its unpleasant taste. On May 3, 1936, she was allowed to leave the hospital and advised to continue this regime and to administer "prostigmin" to herself in emergencies. On May 11, 1936, she returned to the dispensary and stated that she had taken "prostigmin" on three occasions only because of choking sensations and difficulty in chewing and swallowing. She felt better than she had since the winter of 1935. She continued on mono-sodium glutamate until June 1, 1936, at which time she discontinued all forms of treatment. On October 31, 1936, she returned to the clinic, stating that she has continued to feel well.

*We are indebted to Mr. A. J. Patten, of the Huron Milling Co., Harbor Beach, Michigan, for supplying mono-sodium glutamate administered in our cases.

COMMENT

The symptoms of myasthenia gravis in these three patients are of varying degrees of severity. In the first case, muscle weakness of the extremities and back is predominant. In the second patient "bulbar" as well as spinal muscles are involved. The last patient manifests only "bulbar" symptoms to a significant degree. Glycine, ephedrine, and "prostigmin" have been administered to all three patients and in such a way that some comparison may be made of their relative efficacy.

Amino Acids.—An increase in the severity of symptoms was experienced by each patient at times when they had been receiving glycine for over a month. This indicates that relapses may occur in spite of amino acid therapy, and this has been found to be true by others. Dramatic improvement following the use of gylcine probably represents the onset of spontaneous remission and not a direct effect of the drug. We believe, however, that some benefits are derived from glycine and other amino acids, and that these are due to their specific dynamic action and to the increased caloric value they add to the diet. The negative nitrogen balance which occurs during relapse presumably is improved.[24] Mono-sodium glutamate seems to be as effective as glycine (unpublished cases). The claims that glutamic acid is devoid of specific dynamic action are no longer tenable.[25]

All of our patients displayed a fluctuating creatinuria; however, the average level of creatine excretion in patient J. H. (30 per cent of the total creatine plus creatinine output) was almost twice that of patients M. O. and W. C. (The creatinuria of patient M. O. was extremely variable and on some occasions amounted to 70 per cent of the total creatine plus creatinine output.) No regular change in the degree of creatinuria was observed following amino acid administration. The highest levels of creatine excretion were associated with the more acute phases of relapse rather than with amino acid therapy, or any other form of treatment. In one instance (patient J. H.) the effects of glycine administration on the creatinuria were studied during a prolonged remission. The creatine excretion promptly increased, but four weeks later had returned to its original level. This type of response is frequently encountered in patients with progressive musclar dystrophy.

Ephedrine.—All three patients responded favorably to the administration of ephedrine except during the more acute phases of their relapses. Ephedrine is particularly useful in combating the mild residual myasthenic symptoms during remission, and in some instances has ameliorated severer symptoms.[12] However, in our experience, relapse may occur in spite of its continued use, with progression of symptoms beyond control by this drug. With the dosages we have employed, no signs of intolerance have developed.

Prostigmin.—"Prostigmin" adequately relieved the acute and dangerous symptoms of myasthenia gravis exhibited by our patients. There was no evidence of toxic cumulative effects nor of increased weakness as has been reported by Hyland[22] following frequent and prolonged use. No untoward vascular reactions were encountered with the frequent large doses employed (9 c. c. in 24 hours, patient J. H.). Adequate protection with atropine abolished the unpleasant effects on the gastro-intestinal and circulatory systems.

The chief objection to "prostigmin" is that its action is brief. In none of our patients were its effects demonstrable after five hours, and in many individual instances no benefits were discernible after three hours. Although there was no gross depression observable as the effects wore off, the hand grips were regularly found to be slightly weaker than before the drug was administered. This may well have been due to the amount of exercise taken by the patients under the influence of "prostigmin" rather than to a late depressant action. The fact that the drug can be administered repeatedly offsets its brevity of action, and renders it an invaluable agent for diminishing the dangers resulting from dysphagia and respiratory weakness. In addition, its use lessens the risk formerly associated with surgical procedures or intercurrent infections in myasthenic patients.

X-ray Therapy.—Patient J. H. received five courses of x-ray treatment over the region of the thymus gland, and in the first three instances went into remission shortly afterwards. This may well have been coincidental, since the last two courses of treatment were followed by an increase in the severity of symptoms.

We believe that the management of patients with myasthenia gravis may be made more adequate by judicious combination of the various forms of therapy. Symptomatic treatment includes protecting the patient from intercurrent infections, exposure to cold, and undue exertion.

A moderate amount of rest in bed and a generous caloric intake are also advisable. Supplementing the diet with amino acids not only increases its caloric value, but gives the patient the advantage of the resulting specific dynamic action. These precautions should be observed even during periods of complete remission.

With the onset of mild symptoms, the additional administration of ephedrine may be sufficient to afford relief, but with increasing severity of the relapse the adequacy of ephedrine diminishes and in those stages of exacerbation in which the symptoms of dysarthria, dysphagia and respiratory weakness are prominent, "prostigmin" must be relied upon. The very acute and dangerous manifestations may be controlled in this manner until the occurrence of spontaneous remission, after which the frequency of "prostigmin" administration may be decreased, or its use discontinued. However, if at any time the patient wishes to indulge in excessive exercise, "postigmin" should be available for use, and it is probably desirable that it be taken even if the immediate effort calls forth no symptoms. The availability of "prostigmin" in tablet form to be taken orally simplifies its use in this manner. It is to be emphasized, however, that its chief value is in immediately relieving acute symptoms which might otherwise lead to a fatal termination.

SUMMARY

(1) Glycine and ephedrine are useful in the treatment of mild symptoms of myasthenia gravis.

(2) Severe relapse may occur in spite of therapy with glycine and ephedrine.

(3) "Prostigmin" will temporarily restore the functions impaired in mild or severe myasthenic relapse, and may be used repeatedly for this purpose.

(4) "Prostigmin" is the most effective drug now available for combating the acute and dangerous manifestations of myasthenia gravis.

(5) The combination of symptomatic care with the administration of amino acids, ephedrine and "prostigmin" when needed, constitutes the most satisfactory plan of treatment for myasthenia gravis.

BIBLIOGRAPHY

1. Aring, C. D.; and Cobb, S.: Medicine, **14**:77, 1935.
2. Boothby, W. M.: Medical Papers dedicated to Henry Asbury Christian, p. 883. Baltimore: Waverly Press, Inc., 1936.
3. Rosenow, E. C.; and Heilman, F. R.: Proc. Soc. Exper. Biol. & Med., **34**:419, 1936.
4. Butt, Hugh R.: Arch Path., **21**:27, 1936.
5. Bell, E. T. J.: Nerv. and Mental Diseases, **45**:130, 1917.
6. Norris, E. H.: Amer. Jour. Cancer, **27**:421, 1936.
7. Nevin, S.: Brain, **57**:239, 1934.
8. Friesz, J.; and Marno, S.: Klin. Woch., **15**:1272, 1936.
9. Pritchard, E. A. B.: Lancet, **1**:432, 1935.
10a. Boothby, W. M.: Proc. Staff Meetings Mayo Clinic, **7**: 557, 1932.
b. Boothby, W. M.; Adams, M.; Power, M. H.; Edgeworth, H.; Moersch, F. P.; Woltman, H. W.; and Wilder, R. M.: Proc. Staff Meetings Mayo Clinic, **7**:737, 1932.
c. Boothby, W. M.: Arch. Int. Med., **53**:39, 1934.
d. Boothby, W. M.: J.A.M.A., **102**:259, 1934.
e. Boothby, W. M.: Proc. Staff Meetings Mayo Clinic, **9**: 593, 1934.
f. Boothby, W. M.: Ann. Int. Med., **9**:143, 1935.
g. Boothby, W. M.: Medical Papers dedicated to Henry Asbury Christian, p. 883. Baltimore: Waverly Press, Inc., 1936.
11. Edgeworth, H.: J.A.M.A., **94**:1136, 1930.
12. Edgeworth, H.: J.A.M.A., **100**:1401, 1933.
13. Laurent, L. P. E.; and Walther, W. W.: Lancet, **1**:1434, 1935.
14. Wilson, A. T.; and Wright, S.: Quart. Jour. Exper. Physiol., **26**:127, 1936.
15. Walker, M. B.: Lancet, **1**:1200, 1934.
16. Walker, M. B.: Proc. Royal Soc. Med., **28**:759, 1935.
17. Aeschlimann, J. A.; and Reinert, M.: Jour. Pharmacol Exper. Therap., **43**:413, 1931.
18. Edmunds, E. W.; and Roth, G. B.: Amer. Jour. Physiol., **23**:28, 1908.
19. Rothberger, J. C.: Arch. f. d. ges. Physiol., **87**:117, 1901.
20. Rosenblueth, A.; Lindsley, D. B.; and Morison, R. S.: Amer. Jour. Physiol., **115**: 53, 1934.
21. Cooke, A. M.; and Passmore, R.: Quart. Jour. Med. N. S., **5**:21, 1936.
22. Hyland, H. H.: Can. Med. Assn. Jour., **35**:372, 1936.
23. Viets, H. R.; and Schwab, R. S.: New Eng. Jour. Med., **213**:1280, 1935.
24. Adams, M.; Power, M. H.; and Boothby, W. M.: Ann. Int. Med., **9**:1330, 1936.
25. Wilhelmj, C. M.: Physiol. Rev., **15**:202, 1935.

DISCUSSION (*Abstract*)

Dr. F. R. Ford, Baltimore, Md.—I am in complete agreement with the authors' conclusions. At Hopkins we have treated a larger number of cases, about 15 in the last four years, but have not studied them so carefully. We have had little success with glycine when the patients were ambulatory but when the patients were at rest in the hospital, the administration of glycine was usually associated with some improvement. We have been inclined to attribute the improvement to the rest rather than to the glycine. The same statement might be made as regards ephedrine, though I am willing to admit that this drug may have a bit more value. We have seen striking improvement in several cases following radiation over the thymus gland, but in most instances this procedure has been without apparent effect. We have no faith in it. "Prostigmin" has given dramatic results in our experience. Within 5 minutes after this drug is administered hypodermically, the symptoms are usually more or less completely abolished for a period of one or two hours. In our experience of about 10 cases, this happened in every case of myasthenia gravis and we have never seen any improvement whatever in other conditions which might resemble this disease. Judging from the information available at present, we believe that if the injection of "prostigmin" does not cause obvious improvement within a few minutes, the patient does not have myasthenia gravis. The disappearance of ptosis of the eyelids is the most easily demonstrable sign of the "prostigmin effect". Its value in treatment is less certain. In mild cases its prolonged administration

by mouth has given satisfactory results for several weeks or months without evidence of any ill effects. In two cases the use of this drug in severe exacerbations was followed first by transient relief and then by increasing weakness and death. We have gained the impression that in such cases the stimulation of the drug may be followed by a serious increase of symptoms. We are now inclined to exercise a good deal of caution when this drug is to be used in exacerbations. One point may be mentioned. It has been my experience that the acute exacerbations of weakness which occur in this disease are usually the result of infections, especially infections of the upper respiratory tract. It is very important therefore to guard such patients as far as possible from colds and exposure to infection.

Dr. Raymond S. Crispell, Durham, N. C.—The paper read by Dr. Riven is of interest for various reasons, among them because it goes into a biochemical study of the nervous system. If the neurologists and psychiatrists do not watch out and do not keep themselves posted on the subject, biochemical studies are apt to become a part of a field spoken of as neurologia irredenda, or the lost field of neurology.

We are all at a disadvantage in discussing the treatment of myasthenia gravis in not knowing the ultimate cause of the condition. I am at a disadvantage because I have personally had no experience with the use of physostigmin (or "prostigmin") in myasthenia gravis. We all know too little of the biochemistry and pharmacology of muscle metabolism in general and myasthenia gravis and physostigmin in particular.

Myasthenia gravis seems to be related to the muscular dystrophies, or at least it is so by a disturbance of creatinine-creatin metabolism, and also by some therapeutic improvement with the use of glycine (glycocol or amino-acetic acid). As pointed out by the authors of the paper, because of the course and the remissions, we must be cautious about evaluating any therapy in myasthenia gravis. It was not long ago that we were getting noteworthy results with massive doses of strychnine.

The authors have pointed out the reasons we have for believing that the disturbance in myasthenia gravis and perhaps in some of the other muscular dystrophies is at the myoneural junction and that "prostigmin" has an action antagonistic to curare. A possible importance of the potassium ion at the myoneural junction was mentioned by the authors. In this connection it is interesting to mention a case of family periodic paralysis in a medical student under my observation. He has become greatly interested in the subject and believes that in his case he is able to prevent attacks of flaccid paralysis by taking huge doses of potassium citrate.

There would be a greater rationale in the use of "prostigmin" if it could be established that muscles had a parasympathetic innervation. The most recent work seems to show that they do not have any such.

We must know more about humoral integration. Especially must we clear up the part played by choline and its allied products. Recently it was thought that choline and its derivatives were a cure or relief of myasthenia gravis and related disorders. There still remains the possibility that physostigmin may work through choline action, either in the muscle involved or at a distance.

The paper of Drs. Riven and Mason on the treatment of myasthenia gravis is a practical study. I understand that they are already fulfilling the need for more cases in their series. The paper will stimulate all of us to collect other cases of the use of "prostigmin" in myasthenia gravis. Certainly any suggestion of a means of treatment of this condition, especially for the treatment of mild or severe relapses or crises in myasthenia gravis, is welcome. "Prostigmin" seems to be a valuable addition to ephedrine and glycine which have already been used. And in this connection it is well for us to heed the instructions of the workers at the Mayo Clinic who have had the most experience in the use of these substances and who emphasize the point that great judgment and discrimination must be used in the dosage of ephedrine and glycine in these disorders.

The authors hint that glycine is effective because of its specific dynamic action. There must be something more, or else a high protein diet should have the same beneficial effects.

We all know of the disagreeable toxic side reactions with the use of physostigmin. The authors allay our fears of this by telling us that they are satisfactorily controlled by administering atropine, although this creates the rather anomalous condition of giving at the same time a parasympathetic stimulating and a parasympathetic inhibiting drug.

I am sure that we are all interested and stimulated by the paper on the treatment of myasthenia gravis and that we shall all try the use of "prostigmin," especially in combating the acute and dangerous manifestations. From the experience of the authors and others will come the final evaluation of the use of "prostigmin" in particular and the treatment of myasthenia gravis in general.

Dr. Walter J. Otis, New Orleans, La.—I rise to ask the essayist if, in his opinion, we are again having a rather marked cycle of myasthenia gravis arising at this time, inasmuch as medical literature in recent years has cited cases more numerous than we are usually accustomed to. Some decades ago myasthenia gravis was a rather rare entity; then of a sudden we again hear frequently of the occurence of such cases. May I ask the Doctor if he has any explanation to offer for this? Are we possibly dealing with the residual of some infective process which these symptom complexes reveal to us as a myasthenia gravis?

Dr. Jas. Greenwood, Jr., Houston, Tex.—I should like to ask the essayists whether the one to four thousand or the one to two thousand strength solution of "prostigmin" was used. I believe the preparation appears in both of these strengths. In one case of my own it was necessary to administer six doses of 1 c. c. each of the one to two thousand solution.

Dr. Riven (closing).—The administration of "prostigmin" serves two purposes. It is a valuable aid in establishing the diagnosis of myasthenia, and in our experience is more effective than the use of x-ray, ephedrine, and glycine in the treatment of this disorder.

BRAIN ABSCESS*

A REVIEW OF THIRTY-TWO SURGICAL CASES

By FRANK H. MAYFIELD, M.D.
and
R. GLEN SPURLING, M.D.
Louisville, Kentucky

That the mortality rate from abscess of the brain has not been materially lowered during the past decade is evidenced by a voluminous literature on the subject.[2 3 6 10 11 14 17] As a matter of fact, there has been no reported series of brain abscess where recovery statistics compare favorably with those recorded by Macewen[16] in 1893. Dissatisfaction with our own results has led us to review the records of all our cases of brain abscess to determine, if possible, why at times we have been guilty of diagnostic error and more particularly why certain cases which at the outset appeared to offer a reasonable prognosis have frequently proven fatal. This report, therefore, is based upon data from 32 cases treated surgically and 10 cases which for one reason or another were not subjected to surgery.

Etiology.—The etiological factors in this series were essentially the same as those recorded by Evans[9] and others. The origin of the intracranial infection in 16 cases (50 per cent) was otitic disease. In the remainder the mode of entrance was from the following sources: nasal accessory sinuses, 6 cases; lung suppuration, 2 cases; cellulitis of the face, 1 case; typhoid fever, 1 case; osteomyelitis of the skull, 2 cases; penetrating wounds of the brain, 2 cases; and postoperative wound infection, 2 cases. The infecting organisms were the *Staphylococcus aureus* in 10 cases, the streptococcus in 8 cases, the pneumococcus in 6 cases, the *Staphylococcus albus* in 3 cases, and the *Bacillus typhosus* in 1 case. In 4 cases our bacteriological records are incomplete.

Pathology.—It is necessary when considering any abscess of the brain to recognize three stages of the disease, namely: the acute, subacute, and chronic.

Acute Stage.—In the acute abscess, no definite wall or capsule is found. The central necrotic mass is surrounded by hemorrhagic debris and softened brain tissue. The cerebral substance for several centimeters about the abscess cavity is edematous and infiltrated with leukocytes. Little or no fibrosis or gliosis is found in this area.

Subacute Stage.—If the acute abscess ceases to extend into and invade the surrounding cerebral tissue a reactionary wall forms about the necrotic mass. This wall consists of inflammatory tissue composed of fibroblasts, new capillary loops, astrocytes in various stages of destruction and hypertrophy, and profuse gliosis. During this intermediate stage between acute and chronic abscess, there is less edema of the surrounding cerebral substance, and symptoms of encephalitis subside.

Chronic Stage.—This stage applies to a thoroughly encapsulated abscess, the wall of which may vary from 2 to 5 mm. in thickness. The microscopic structure of the wall is essentially the same as described under the subacute stage. If an abscess of this type continues to expand, the surrounding cortical substance suffers from pressure necrosis as well as the inflammatory reaction. Eventually, the cerebrospinal fluid absorptive mechanism is encroached upon with a corresponding increase in the intracranial pressure.

Our operative group consisted of 4 acute abscesses, 16 subacute, and 12 chronic ones. The lesions were distributed in the various lobes of the brain as follows: the cerebellum, 8 cases; the temporal lobes, 10 cases; the frontal lobes, 8 cases, one of which was bilateral; the parietal lobe, 3 cases; the occipital lobe, 1 case; and 2 were subdural.

Diagnosis.—We shall not analyze the usual signs and symptoms of brain abscess. They are similar to those of any expanding lesion of the brain plus signs of infection. The value of a carefully taken history and repeated neurologic examinations in the diagnosis of brain abscess cannot be over-emphasized. In the majority of instances the presence and location are fairly easy to demonstrate, particularly in the acute and subacute stages. The primary focus is usually obvious, though at times the pathway of infection is difficult or even impossible to prove. As an example, one case of our series developed a typhoid frontal lobe abscess two years after all symptoms of the primary disease had subsided. In 28 instances we were able to arrive at a diagnosis and determine the location of the abscess, as well as a fairly accurate understanding

---

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Surgery, University of Louisville School of Medicine.

of its stage of development, by clinical methods alone.

We do not mean to imply that the diagnosis of brain abscess is always an easy one. Ten additional cases not included in the surgical statistics have come under our observation. None of these was operated upon. Eight of this group had unmistakable signs of diffuse meningitis on admission and a ruptured abscess was demonstrated at the postmortem examination. The other two cases had been under our observation for sufficient time to have established a diagnosis, but in neither instance did we interpret the clinical picture correctly.

We believe that this percentage of diagnostic error could be materially reduced if there was a more general appreciation of the early signs and symptoms of the disease. In analyzing the records of the 10 cases not subjected to surgery we find that there were symptoms early in the primary illness that should have indicated cerebral complication. Usually there had been headache and vomiting, nearly always lethargy, and in 4 instances there had been convulsions. In most of the cases these symptoms had been transitory and the fatal illness from meningitis was ushered in acutely after an interim of symptomatic improvement. In view of these experiences we now believe that any patient showing even transitory signs of cerebral complication from an obvious focus should be kept under the closest observation and if symptoms do not clear up completely in reasonable time, needle exploration of the brain should be carried out. If this procedure had been followed in our group certainly some of these fatal diagnostic errors might have been avoided.

In analyzing from this point of view the 12 chronic abscesses of our series we find that 8 of them showed signs of brain involvement long before they were referred to us as brain abscess suspects. Four of the patients had been subjected to operation upon the mastoids or nasal accessory sinuses and within the first few hours postoperatively they had symptoms of brain involvement, to-wit, headache, vomiting, lethargy, and convulsions. Whether or not the onset of those symptoms indicated primary development of the intracranial infection or the spread of infection from an already existent abscess is problematical.

The secondary onset of symptoms frequently seen with chronic abscesses may simulate almost any disease of the brain. Occasionally they may resemble cerebral vascular accidents. One patient of our series graphically demonstrates the difficulty of this differential diagnosis.

M. H., a woman, aged 48, eight days before admission suddenly developed a partial left hemiplegia, stiff neck, and a suggestive Kernig's sign. The only fact in the past history to suggest infection was a right mastoid operation performed three months before. The fundi were normal. Examination disclosed a partial spastic hemiplegia on the left, slight stiffness of the neck muscles, and a suggestive Kernig's sign. Spinal puncture revealed normal pressure and slightly xanthochromic fluid, containing only 6 cells per cu. mm. She was discharged with a diagnosis of cerebral hemorrhage with rupture into the subarachnoid space. We did not see the patient again, but follow-up notes from her local physician indicated that her symptoms improved for a while after she left the hospital, but began to regress, as was evidenced by increasing weakness in the left arm. One month after discharge she suddenly developed violent headache, became unconscious, and died within a short while. Autopsy revealed a large well encapsulated abscess of the right temporosphenoidal lobe which had ruptured into the ventricle. Reinvestigation of the history showed that at the time of the mastoid operation she had considerable headache and vomiting. These symptoms subsided and no great importance was attached to them. No doubt these symptoms indicated the original insult to the brain.

In 3 cases of our series in which we strongly suspected the presence of an abscess we were unable to determine its location by clinical examination alone. One of our earlier cases was subjected to several negative explorations. The lesion, however, was never located and the patient died of meningitis from rupture of the abscess into the ventricle. Since this unfortunate experience we have been confronted with a similar situation in two cases. In both of these we resorted to ventriculography and were able to locate the lesion. Ventriculography was used in another case when a brain tumor was suspected, but an abscess demonstrated. A bone flap was reflected, but fortunately before the dura was opened the brain was explored with a ventricular needle and the abscess aspirated. The patient made a complete recovery with this single aspiration of the abscess cavity. We now use ventriculography as a diagnostic aid when the location of an abscess is in question. We have, also, been able to differentiate serous arachnoiditis and brain abscess in 6 cases by this method and have observed no harmful effects from the introduction of the air.

Treatment.—Before speaking of treatment of the abscess itself, a word might be said about the management of the primary focus. A point of view regarding the prevalent use of mallet and chisel for eradication of diseased mastoids was stressed by Hugh Cairns.[3] He called atten-

tion to the dangers of repeated percussions of the skull and suggested that many of the intracranial complications of mastoid disease might be precipitated by this operative technic. He advocated the adoption of a less traumatic method, namely, the use of burrs and rongeurs. We fully subscribe to this point of view. Furthermore, the common practice of inducing deep anesthesia for these operations, particularly when an intracranial complication is feared, appears to us likewise to be dangerous. If a diseased mastoid can be eradicated under local anesthesia with a minimum of skull trauma, then the delicate barriers to infection between the skull and the brain will be greatly protected.

It is a great temptation at times, when an abscess is suspected, to make an exploration through an already septic field such as that left by a radical mastoid operation. This practice cannot be too forcibly condemned. If a well walled off abscess is encountered and drainage adequately instituted, recovery may be uneventful. If, however, the diagnosis is incorrect, or if the abscess is not found by such an approach, a fatal meningitis or an infection in the brain along the tract of the exploratory puncture may result.

Before attempting to discuss the relative merits of the various operative procedures advocated for the cure of intracranial abscess, we should like to emphasize that selection of a method for any particular case may depend upon the stage of development of the inflammatory reaction. An acute abscess, that is, one in which the symptoms and signs of encephalitis predominate, is rarely, if ever, a surgical problem. Lesions of this type should be treated conservatively until the natural healing processes have had sufficient time to localize the infection. We advocate the use of every method at one's disposal to relieve intracranial pressure before resorting to what usually proves to be a useless exploration. The pressure can nearly always be kept under control by dehydration, and once the febrile reaction has subsided and the cerebrospinal fluid no longer contains polymorphonuclear leukocytes, then aspiration of the abscess becomes indicated. It is at this point that we consider the process to have passed into the subacute stage, and it is at this point further that surgical treatment appears to offer the best chance for cure.

It is often difficult to persuade the family and attending physician that waiting is the best policy during the acute stage. Most people cannot understand why, once the diagnosis of an abscess is made, drainage is not instituted immediately. It is our custom to make a comparison between an abscess and an ordinary boil on the surface of the body. Most people readily appreciate why it is dangerous to cut a boil during the acute stage.

There are, unfortunately, certain cases of acute brain abscess that seem never quite to localize. With a patient losing ground daily and the intracranial pressure getting out of control, one is always tempted to operate in the vain hope of changing an otherwise hopeless outlook. Four such cases have occurred in our series. All four of them died.

Most authors have considered the chronic brain abscess as offering the best prognosis to surgical treatment. Our experience does not bear out this point of view. We have had 16 subacute abscesses subjected to surgery with 12 recoveries and 4 deaths. We have had 12 chronic abscesses treated surgically with 6 recoveries and 6 deaths.

We claim no originality for any methods of treatment now in use, but have, at one time or another, used most of those advocated by other authors. In the 32 cases of our series we have followed approximately the following procedure. In most cases the abscess cavity was first aspirated as recommended by Dandy;[7] many of them were aspirated repeatedly. When it became obvious that this method was inadequate to cause healing of the lesion other more radical methods were instituted. In 17 of the cases treated by aspiration alone there were 9 recoveries and 8 deaths. However, 4 of the deaths occurred in patients with acute abscesses and were hopeless problems from the onset. The remaining 15 cases were aspirated at first, but as this method obviously failed, other procedures were instituted. In 6 of the cases Coleman's[5] small rubber catheter technic was followed, but in no instance did we feel that the catheter drained satisfactorily. However, 3 of these cases recovered, but we question whether or not the recovery might have occurred just as satisfactorily with repeated tappings. In 9 cases where repeated tapping of the abscess cavity had failed we employed the marsupialization method as advocated by Cushing,[11] Horax,[11] and King.[15] In this group there were 5 recoveries and 4 deaths. In 1 case in which repeated tappings, catheter drainage, and marsupialization had failed we resorted to the decortication method of King[15] and were finally successful in curing the patient. We

have never attempted to enucleate the abscess *in toto* as advocated by Cairns,[3] Adson[1] and others.

It is generally agreed that no one method is suitable for every case; in each case the procedure attempted should be dictated by several factors, particularly the stage of development of the abscess and the depth of the wall beneath the surface. Dowman[8] first advocated a two-stage operation, by first inducing protective adhesions between the brain cortex and the dura before establishment of drainage at a later date. Kahn[12] has modified this and made a valuable contribution to the technic of handling deeply seated chronic abscess. He advocated the creation of a large defect in the skull preliminary to drainage with opening of the dura to promote migration of the wall to the surface. In view of some of our failures with deeply seated abscesses we intend to try this method in the future as it appears to offer a two-fold advantage: (1) it promotes migration of the abscess wall to the surface; (2) it effectively seals off the subarachnoid space overlying the abscess. Even with Kahn's[12] method before resorting to wide opening of the capsule we should be inclined to attempt repeated tappings of the abscess at the second stage.

While we believe that aspiration of the abscess cavity, particularly during the subacute stage, is the method of choice, yet there are certain inherent dangers connected with it and it is not adaptable to certain cases. We have had four deaths from meningitis following the use of this operation in chronic cases. In each instance the abscess was a superficial one and contained a large amount of pus. When the aspiration had been completed the cortex fell away from the dura alarmingly and soiling of the subarachnoid space occurred promptly. Had we obliterated the subarachnoid space before aspirating the pus we believe this complication might have been avoided.

Prognosis.—In compiling our mortality statistics we have included all cases which were subjected to surgical treatment. No case has been excluded because it was an unfavorable surgical risk. The mortality rate was 44 per cent. Were we to exclude the four acute cases, which never should have been subjected to surgery in the first place, and the 2 chronic cases which had meningitis when first seen, our mortality rate would have been 25 per cent. We feel that this last figure more accurately represents the risk to which patients with chronic and subacute brain abscesses are subjected provided the diagnosis is established in a reasonable time.

In our recovered group there have been remarkably few disabling residual symptoms. Only 3 of the patients have had epileptiform seizures and one of these suffered an extensive gunshot wound of the frontal lobe in which the abscess was a secondary development.

SUMMARY AND CONCLUSIONS

The review of records from 32 cases of brain abscess treated surgically and 10 cases which for one reason or another were not operated upon disclosed certain pertinent facts which seem to justify the following conclusions:

(1) The profession as a whole is not alive to the fact that such symptoms as headache, vomiting, lethargy, or convulsions are not consistent with uncomplicated bony infection and when present indicate brain involvement. Patients with these symptoms should be considered brain abscess suspects until proven otherwise.

(2) When serious doubt exists as to the presence or location of an encapsulated abscess we favor needle exploration of the suspected area and, if necessary, ventriculography.

(3) The use of mallet and chisel and deep anesthesia in the eradication of diseased mastoids appears to incur the danger of actually inducing intracranial infection or spreading an already existent one.

(4) An acute abscess is rarely, if ever, a surgical problem.

(5) Our best results were obtained when the abscess was treated during the subacute stage. The aspiration technic of Dandy[7] appears to be ideally suited to this type of lesion except for certain large superficial abscesses.

(6) When repeated aspirations prove inadequate and the capsule is sufficiently tough, we favor the marsupialization technic.

BIBLIOGRAPHY

1. Adson, A. W.; and Craig, W. McK.: The Surgical Management of Brain Abscess. Ann. Surg. (Jan.) 1935.
2. Bagley, Charles, Jr.: Brain Abscess: Clinical and Operative Data. J.A.M.A., **81**:2161-2166 (Dec. 29) 1923.
3. Cairns, Hugh: Brain Abscess from the Point of View of the Neurological Surgeon. Proc. Roy. Soc. Med., **22**:45 (May) 1930.
4. Coleman, C. C.: Brain Abscess. J.A.M.A., **95**:568-571 (Aug. 23), 1930.
5. Coleman, C. C.: Some Observations on the Drainage of Subcortical Brain Abscess. Arch. Surg., **10**:212-216 (Jan.) 1925.
6. Coleman, C. C.: The Treatment of Abscess of the Brain. Arch. Surg., Part I, **18**:100-116 (Jan.) 1929.
7. Dandy, W. E.: Lewis' Practice of Surgery, vol. 12. Hagerstown: W. F. Prior Co., Inc., 1934.

8. Dowman, Charles E.: The Treatment of Brain Abscess by the Induction of Protective Adhesions between the Brain Cortex and the Dura before the Establishment of Drainage. Arch. Surg., **6**:747-754 (May) 1923.
9. Evans, William: The Pathology and Aetology of Brain Abscess. The Lancet, p. 1231 (June 6) 1931.
10. Grant, F. C.: The Mortality from Abscess of the Brain. J.A.M.A., **99**:550-556 (Aug. 13) 1932.
11. Horrax, Gilbert: A Method for the Treatment of Certain Chronic, Encapsulated Brain Abscesses. Surg. Clin. of N. Amer. (Oct.) 1934.
12. Kahn, Edward: Personal communication.
13. King, Joseph E. J.: Brain Abscess. Ann. Surg., **191**:—— (Jan.) 1935.
14. King, Joseph E. J.: Brain Abscess. Ann. Surg., **103**:—— (May) 1936.
15. King, Joseph E. J.: The Treatment of Brain Abscess by Unroofing and Temporary Herniation of Abscess Cavity with the Avoidance of Usual Drainage Methods. Surg., Gyn. & Obst., pp. 554-568 (Nov.) 1924.
16. Macewen, William: Pyogenic Infective Diseases of the Brain and Spinal Cord, 354 pp. New York: The Macmillan Company, 1893.
17. McKenzie, K. G.: The Treatment of Abscess of the Brain. Arch. Surg., **18**:1594-1620 (April) 1929.
18. Spurling, R. Glen: Cerebral Abscess. Cyclopedia of Med. Philadelphia: F. A. Davis Co.

DISCUSSION (*Abstract*)

Dr. Harry Wilkins, Oklahoma City, Okla.—The experience in our own clinic has been such that I can subscribe to all the major points brought out by Dr. Mayfield. In some minor details we may differ. For example, we have tended to rely on aspiration alone to a lesser degree and should be inclined to establish continuous drainage, providing a definite wall has formed, in those abscesses that refill after a single initial aspiration has failed to effect a cure.

In the "aspiration" of a deep seated or even superficial abscess a point made by Dr. Dandy in his original paper should be stressed. That is, that so long as the intracranial pressure causes a flow of pus from the exploring cannula there is little danger of spread of the abscess by rupture of the wall or rupture of adhesions between the cortex and the meninges. However, if actual suction by a syringe is necessary to evacuate the pus, danger of rupture of nature's wall is imminent and continuous drainage by one method or another becomes the treatment of choice.

Aspiration certainly is a worth while procedure in those cases where complete "walling off" has failed to occur. In such an instance we have made use of small muscle stamps to seal the puncture wound in the pia mater so that a meningitis spreading from the site of the puncture is prevented.

We have continued the plan of marsupialization in those cases of "walled off" superficial abscesses.

The presence of meningeal signs always adds to the gravity of the situation, particularly when micro-organisms are identified in the spinal fluid. I would warn against lack of careful and continued conservative care. General measures of support, administration of fluids, control of intracranial pressure by one means or another may tide the patient over, allowing time for the processes that encapsulate the local acute inflammatory process and subsidence of the diffuse meningeal symptoms and signs. Within several days to a few weeks drainage of the abscess may then effect a cure. In the meantime removal of the focus adds materially to the treatment if the focus is such that removal is possible.

In conclusion, may I say a word in behalf of the otologist? In many carefully executed nasal or mastoid operative procedures intracranial complications occur incidentally. I join Dr. Mayfield in admonishing the otologist to great care in the use of his instruments and urge that the rongeur, perforators and burrs replace the chisel and mallet.

Dr. Joseph E. J. King, New York, N. Y.—I am opposed in general to the use of blind tapping for drainage of an abscess, or the tubal method, inasmuch as one cannot see what is done. One never knows whether there is pericapsular necrosis in these cases, or whether the pocket is multilocular, or not. Therefore, it is beyond my comprehension to understand how these can be treated by blind tapping or the introduction of a tube without seeing what is done.

The large majority of abscesses, which are not metastatic in origin, are single and not multiple, as some writers have stated. The outer wall of most of them is fairly close to the surface of the cortex, within 2 or 3 cm.; they are not deep isolated abscesses as one might think from reading some papers. If one will observe sections of the brain in cases of brain abscess in museums, one will see that this is true. It is also to be noted that the hemisphere in which the abscess is located is at least one-third or half again as large as the one of the opposite side. We all know that brain abscesses are replacing lesions, that is, they occupy the site once occupied by normal tissue. Therefore, a large portion of the hemisphere which is increased in size is due to edema and not to the abscess itself. What could be more logical than to make a fair-sized opening in the skull, dura and brain, and allow this edema to escape with the pus? It is believed that this is accomplished by the procedure which I have advocated since 1920, and which was first published in 1924. The floor of the abscess is allowed gradually to come forward and outward to the surface to the level of the skull. Further herniation is not desired and is not allowed. When the floor of the abscess has reached the level of the skull, it is maintained at this level by positioning of the patient, catharsis, and lumbar puncture if necessary. The floor of the abscess cavity becomes obliterated and is lost in the general scar tissue at the site of the wound, and the area finally becomes covered with epithelium. By so doing, the danger of a secondary pocket and rupture into the ventricle from the use of a tube are obviated.

I have had no experience with the method of tapping advocated by Dandy. I do not think any method is suitable for the treatment of all brain abscesses, but I do believe that the open method, as advocated by Adson, Horrax, Cahill, myself and others will give a better opportunity to inspect the cavity than any other method.

I have seen thirty-six cases of non-metastatic abscess and seven cases of metastatic brain abscess. Only about twenty-five offered any hope of relief when first seen. Of this number, twenty cases have recovered following the use of the procedure which is advocated. None of the twenty cases was subjected to more than one operation for the abscess; multiple operations or explorations were not done. I think one should use the operation with which one is most familiar, and which gives the best results in his hands. Kahn's method of bringing the deeper seated abscesses to the surface where they may be dealt with as described above is to be commended.

I might add that the dressings and after-care are most important in the management of these cases.

(A colored motion picture was shown illustrating the advocated operation and the wound as seen at subsequent dressings until healed.)

Dr. Mayfield (closing).—I cannot agree with Dr. King regarding treatment, for our results have been better with the simpler methods. However, I do believe that after simple aspiration has failed, operation described by Dr. King is the method of choice. It is obvious that such a procedure as this must necessarily leave considerable residual scar in the brain, and it is surprising that Dr. King has had very few patients with epilepsy following treatment. In our series of cases, three patients developed epilepsy and in each of them King's operation had been used after failure of the simple forms of treatment.

Our mortality rate was 44 per cent. Dr. Wilkins has called attention to the use of muscle graft in sealing the pathway of the needle. This may be quite a valuable step. He called attention to the necessity at times of open drainage where there are multiple abscesses or large daughter abscesses forming. I think this is, of course, true, so that the second abscess might be drained through the cavity of the first, but one never knows until after drainage is instituted whether or not he is dealing with multiple lesions.

THE MANAGEMENT OF ACUTE HEAD INJURIES*

By C. C. Coleman, M.D.
Richmond, Virginia

The purpose of this paper is to discuss the practical application of certain principles which are considered of fundamental importance in the treatment of acute head injuries.

It is difficult to establish definite criteria in the management of cases with head injuries or to compare the results of one method of treatment with those of another. A complete diagnosis of the lesion in the patient who recovers is often impossible and autopsy findings, while demonstrating objectively the gross pathology, may very incompletely show the relative effects of the several associated lesions in a particular case. This blurring of the pathologic picture in the recovered cases, and the impossibility of closing the present gaps in our knowledge as to the effects of various types of traumatic lesions upon the brain by autopsy studies, are responsible in a large measure for unsound methods of treatment.

Practically all discussions dealing with head trauma emphasize the great importance of the brain injury and very properly assign to the associated fracture of the skull a subordinate position in the pathology of the case. A complete study of head injuries includes first of all a careful investigation of the more important brain lesion, but the best results in large series of cases of head trauma are obtained if adequate attention is given to the skull fractures as well as to wounds of the scalp. The fact that exclusive consideration was formerly given to the fracture while the brain injury was largely disregarded, constitutes no good reason for ignoring the fracture now when methods of diagnosis and treatment of the brain injury have improved. It is important to know that the patient has a fractured skull in cases of suspected middle meningeal hemorrhage, which practically never takes place without a fracture over this artery or one of its branches. Simple depressed fractures are often difficult to detect by palpation and in such cases x-ray examination is required. It may be of great help in the diagnosis to know that an unconscious patient without history of injury has a linear fracture of the skull so that other common causes of unconsciousness may be excluded. In compound fracture of the vault with fragmentation of the in-driven bone, preoperative x-ray examination gives indispensable information.

The entrance of air into the meninges and brain following fracture of the paranasal sinuses or mastoid can be determined only by x-ray study. Without x-ray study, pneumocephalus would rarely be suspected.

In the large majority of head injuries the x-ray examination gives no information of value either in the diagnosis or in the treatment, and it is never of sufficient importance to be required until after shock has been overcome. The information disclosed by x-ray examination should be utilized in the management of the case with neither exaggeration nor depreciation of its value.

The frequent association of a head injury with injuries in other portions of the body creates problems of great difficulty. The inability of the unconscious patient to direct the examiner's attention to symptoms arising from a fractured spine or pelvis, or even the rupture of an abdominal organ, may easily result in greatly delayed discovery of such injuries. A systematic examination of the entire body in a

*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Neurological Surgery, Medical College of Virginia.

patient with a serious head injury is a minimum requirement, and this should be made as soon as the surgeon is convinced that the general condition of the patient would not be harmed by the examination.

Complaint of pain and tenderness along the spine is an indication for x-ray examination of the vertebrae involved in the complaint. It is well to remember that the stiffness of a broken neck in unconscious patients has frequently been erroneously attributed to bloody spinal fluid from an intracranial injury. Whatever one's attitude may be as to the value of x-ray examination of the skull in these cases, there can be no doubt of its value in the study of suspected spinal injury associated with head trauma.

In the preparation of this paper we have reviewed a series of 1,078 cases of head injury admitted to the Hospital Division, Medical College of Virginia, between January 1, 1933, and January 1, 1936. Patients dying in the receiving ward before they could be admitted are not included in the series.

It was found that while these 1,078 patients were admitted primarily for the treatment of head injury, there were 291 cases with important injuries elsewhere in the body. These 291 associated injuries do not include injuries to the face or jaws.

From analysis of 388 consecutive cases in this series of 1,078 patients, one is justified in the opinion that shock, as determined principally by blood pressure below 100 systolic in the adult is of infrequent occurrence when the injury is confined to the head (6.9 per cent). The widely accepted belief that shock is a usual result of head injury is not substantiated in my experience. When shock is present to a marked degree it is more frequently the result of severe associated injuries.

The general management of head injury in the early stages of the injury is of the greatest importance. Competent observation of the patient in shock without disturbing him, aided by frequent blood pressure readings, will furnish those with experience a working basis for the immediate treatment. The patient's resistance should be protected in every possible way to enable him to withstand the primary effect of the injury. If shock is present the entire treatment should be directed to the relief of this condition. Harassing clinical examinations serve only to intensify the shock. While records of blood pressure throw little light on the alterations of intracranial pressure resulting from brain injury, such records are most helpful in determining the degree and progress of shock.

Two errors may be made in the management of cases with reference to shock. The first is the tendency to subject the patient to x-ray study or some surgical procedure during the stage of shock, while the second error consists in regarding shock as present long after it has disappeared. Both errors should be avoided by careful clinical study and frequent blood pressure estimations. When the patient's general condition is no longer a matter of serious concern, a systematic effort should be made to evaluate the primary effects of the injury upon the brain.

In severe head injury, pulmonary complications often develop. These complications induce cyanosis and add greatly to the effects of the damage produced by the injury. While the head-elevated position is preferred when the patient is not in shock, or when he is free from pulmonary complications, should the latter develop, elevation of the foot of the bed 8 to 10 inches with the patient in a lateral, prone position may be life-saving. With the patient in this position, large quantities of bronchial fluid are drained away or removed from the mouth with a suction apparatus. The relief of cyanosis with the consequent lowering of intracranial pressure by this posture results in prompt improvement. With the exception of the transformation of a patient whose intracranial pressure has been promptly relieved by removal of a large extradural clot, no procedure in our experience in the treatment of head injury has been productive of more excellent results than the lowering of the head to overcome the respiratory difficulties of these patients.

A primary objective in the treatment of head injury is the prevention of infection by well-timed operation. Opportunities for the prevention of infection in such injuries are enormously multiplied in the treatment of scalp lacerations by adequate disinfection and excision of the edges of the contused laceration. While healing of contused scalp lacerations may take place without serious infection, even when not properly treated these lacerations may, when inadequately disinfected and debrided, frequently become infected and lymphangitis, erysipelas or brain abscess result. We have treated a number of brain abscesses in which the abscess resulted from an infected laceration of the scalp without an associated fracture of the skull.

Open wounds of the head produced by blunt force, whether confined to the scalp or involving the skull and brain, should be treated as promptly as the patient's general condition permits. The indications for prompt operative treatment of these wounds to prevent infection which often results in disastrous consequences, are just as reasonable as those for penetrating wounds of the abdomen. In such cases prompt operation is done to prevent a complication which may result fatally. Obviously, surgical treatment should not be undertaken until the patient has recovered from shock, but shock is infrequent in such cases.

Adequate treatment of compound, depressed fractures with penetration of the dura and laceration of the brain includes proper treatment of the laceration of the scalp, the removal of indriven bone fragments and thorough debridement of the brain wound. After the external wound has been disinfected and the overlying scalp laceration excised, the bone fragments are removed. To minimize the chances of infection and to lessen scar formation in the brain, the macerated brain tissue should be carefully removed by irrigation and gentle suction. The operation in these cases is done under local anesthesia which is preferred in all surgery for head trauma. Much time and patience are required to remove the damaged brain tissue and to control hemorrhage, but this is by far the most important part of the treatment of such cases.

Unfortunately, the use of gauze strips placed in the dural opening has not been abandoned in operation for compound fractures. Gauze drainage inevitably leads to the formation of a brain fungus, with septic cerebritis, brain abscess or meningitis as an invariable consequence. No drainage of any kind should be inserted through the dura. The contaminated material should be removed completely by irrigation and suction, and if this is not accomplished, no help can be expected from gauze packing. The dura should be tightly sutured and when this is not possible the dural defect should be patched with a piece of temporal fascia, or galea. The results of operation in these pericronium cases are exceptionally good. They usually escape the extensive diffusion of force and the widespread damage to the brain which are common in severe head injury without a depressed fracture.

Epilepsy which often follows depressed fractures of the skull, whether simple or compound, is much less likely to occur if excessive scar tissue formation in the brain is prevented by proper treatment of the brain wound at the time of the operation for compound fracture of the skull.

Little can be done to prevent infection of the brain or its membranes in fractures which involve the mastoid, posterior ethmoids or sphenoid sinuses and which result in the communication of these sinuses with the cerebrospinal fluid spaces. Whether or not meningitis will develop depends almost entirely upon the presence or absence of infection in the sinuses involved in the fracture. No local treatment of the nose or ear other than the simple disinfection of the external ear is indicated in cerebrospinal fluid leaks. Meddlesome interference with the nasal passages in an attempt to disinfect, is not only futile but harmful.

It is generally assumed that the reduction of intracranial pressure is often necessary in the treatment of injuries to the brain and it is in the treatment of the pressure effects of such injuries that the greatest controversy is now being waged. While some increase of intracranial pressure is a common effect of brain trauma, a dangerous rise in pressure in the absence of surgical hemorrhage is in my experience infrequent. Fatalities frequently occur in patients whose intracranial pressure may be subnormal, normal or only slightly elevated. There is no good reason to believe that elevation of intracranial pressure is the predominantly important factor in the mortality of patients with brain injury. It is true that one frequently sees a patient almost immediately after a head injury in whom there is profound unconsciousness, Cheyne-Stokes respiration and signs of a rapidly progressive compression. These patients generally have a massive basal hemorrhage which cannot be controlled by any means now at our disposal. If the patient does not have a rapidly fatal hemorrhage and if he does not subsequently develop an extradural or subdural hematoma, it is unlikely that he will die from intracranial pressure. The principal causes of mortality in my experience appear to be widespread laceration or contusion of the brain, intracranial infection, and massive intracranial hemorrhage.

One effect of trauma upon the brain is the production of edema but edema alone appears to be too frequently assigned as a cause of

dangerous intracranial pressure. It would seem more logical to consider edema as only a part of the pathology and subordinate, as a cause of death, to intracranial clots and extensive laceration and contusion of the important areas of the brain.

In the investigation of head injuries the clinical study of the patient takes first place. This clinical study is necessary for a proper understanding of the effects of the injury upon the patient. Either these effects are brought about by pressure, extensive laceration or contusion of brain tissue or by some condition not yet thoroughly understand which causes a condensation of the brain tissues with a low intracranial pressure. The study of the effects of brain injury upon consciousness is of the greatest importance. Nearly all of these patients are unconscious upon admission to the hospital or have a history of an unconscious period. I am thoroughly convinced that prolonged unconsciousness following head trauma is not necessarily a sign of general pressure. Profound unconsciousness is frequently due to brain stem lesions without elevation of pressure. Prolonged unconsciousness from any lesion denotes a condition with serious potentialities. Transient consciousness with a return to unconsciousness after a conscious interval, is significant of a progressive lesion, generally an extradural clot. Careful observation of the state of consciousness, temperature, pulse, respiration, condition of the pupils and focal paralyses gives information of significance in all cases if properly interpreted.

There has been a tendency in the past few years to standardize the treatment of head injury upon the basis of alterations of measured spinal fluid pressure following injury. In order to do this, lumbar puncture has been almost routinely employed in some clinics. We have resorted to lumbar puncture after careful neurologic study in about 15 per cent of the cases in this series. Lumbar puncture is useful to determine the degree of general intracranial pressure and to remove bloody spinal fluid in patients who, though not in serious danger, show retarded convalescence and complain of headache which has been attributed to the presence of blood in the cerebrospinal fluid. Except in this type of case, we have abandoned the use of lumbar puncture in the treatment of head injury.

While experience has not indicated to me that lumbar puncture is a dangerous procedure in the usual type of head injury, it should be carefully avoided when extradural hemorrhage is suspected. The information obtained from lumbar puncture should not be accepted if it is inconsistent with the more important clinical findings. Patients vary widely in their response to pressure. Some improve while the pressure remains elevated, but others progress unfavorably, when the spinal fluid pressure is declining.

Normal, slightly elevated or even a low spinal fluid pressure is not inconsistent with the presence of an intracranial clot. A normal pressure as shown by lumbar puncture even when a clot is present, in no way reflects upon the accuracy of the procedure in determining the degree of intracranial pressure, for in my experience, an intracranial clot is not invariably accompanied by a rise of general intracranial pressure as determined by lumbar puncture readings.

We abandoned the use of hypertonic glucose solution and dehydrating agents such as magnesium sulphate in the treatment of acute head injuries before the series under consideration in this paper was started. The control of intracranial pressure by these drugs had been tried extensively in my clinic without satisfactory results. We use intravenous glucose in certain emergencies in which the control of pressure by more permanent means is under way. There is no doubt that intravenous administration of hypertonic glucose solution will reduce intracranial pressure temporarily but after a brief fall there is a secondary rise which reaches a higher level than that of the original pressure. Evidence has not been produced to show that the use of intravenous hypertonic glucose solution and dehydrating agents lowers the mortality rate of brain trauma. In my own experience with dehydration it was found that if the dehydration were carried to the extent where fluid was removed from the brain in sufficient amount to cause marked reduction of intracranial pressure, the condition of the patient was made worse rather than better. A rise of temperature and deepening of stupor are frequent results of such treatment. The requirements of fluid in these cases are about the same as those of the average seriously ill patient and we practice no restriction of fluid in the treatment of them.

In the treatment of intracranial pressure from head injury it is of primary importance to determine promptly whether the pressure shown by clinical study of the patient, aided some-

times by lumbar puncture, is due to an intracranial clot. If the patient has an intracranial clot no time should be lost in removing the clot and controlling the bleeding. The diagnosis of this condition is often extremely difficult and is made in many cases only by exploration through a burr-opening. The well known classical symptoms and signs of extradural hemorrhage may sometimes be due to contusion of the brain, but the assumption of hemorrhage is generally a safe one. In some cases pressure is due to edema of the brain plus a subdural clot. Patients with acute subdural clots usually have bloody spinal fluid, increased intracranial pressure and frequently a return of signs of compression after some temporary improvement.

More frequently within the past few years we have used diagnostic burr exploration in suspected subdural clots when the clinical study was inconclusive. The burr opening is made in the upper temporal region and is always done under local anesthesia. A button of bone may be removed with a hand trephine and replaced if investigation of the subdural space is negative for clot. It is often necessary to make bilateral openings and to enlarge one or both openings to remove the clots. In a few cases in which there is no evidence of clot, if the intracranial pressure continues to be elevated to a dangerous level and the general condition of the patient shows no improvement, we do a subtemporal decompression. The disfavor with which this operation is regarded is a logical reaction to its indiscriminate use twenty or thirty years ago. Subtemporal decompression is rarely required at the present time, certainly not in more than 2 per cent of the cases. It should be done under local anesthesia, supplemented in the restless cases by tribromethyl alcohol. If an inhalation anesthetic is required, this should be considered a relative contraindication to the operation. The infrequency with which mechanical relief of pressure has been required in this series and the fact that we have not substituted other measures of relief of pressure, such as lumbar drainage, dehydration and hypertonic solutions, have convinced me that pressure in the absence of clot formation is not a common cause of death in these cases.

The importance of the medical and nursing care of the patient with head injury cannot be too strongly emphasized. In many cases, competent care is the main factor in recovery. Absolute rest, the control of restlessness by such drugs as bromides, chloral and phenobarbital, feeding the unconscious patient by nasal tube, proper posture and adequate supply of water may be mentioned as important items in such care. The effects of head injury are frequently interwoven with those of alcoholic intoxication and in such patients paraldehyde may be used to combat restlessness or delirium. If simple drugs fail to control restlessness we have no hesitation in using morphine, provided, of course, the patient does not have high intracranial pressure. Many of these patients continue to be restless for weeks, and there may be no evidence whatsoever of increased intracranial pressure. The treatment with respect to the use of morphine and in all other particulars, must be individualized to meet the needs of the patient.

The management of head injuries briefly outlined in this paper appears to be justified by a mortality rate of 8.25 per cent for the three-year series comprising 1,078 cases. Of the series, 301 or 27.8 per cent had fractures of the skull. The mortality rate in this group was 18.6 per cent. Reference is made to the mortality percentage of cases with fracture because if only these cases are included in a compilation of statistics, the mortality rate is always higher than when all types of head injuries are considered. This indicates only that these patients as a group are the recipients of more violent trauma and consequently receive greater brain injury. They are also more often exposed to serious infection.

Thirty-three patients died who had no demonstrable skull fracture and of this group there were severe associated injuries distributed in various regions of the body in twenty cases. Concomitant injuries of the chest, spine, and pelvis may seriously interfere with the treatment of the intracranial lesion.

Further data compiled from analysis of the series, while of great interest, is not essential to the purpose of this discussion.

The treatment of acute head injuries actively concerns everyone interested in clinical medicine. The distribution of these cases in country districts, and small towns as well as in large cities, makes it essential that the methods of diagnosis and treatment should be emphasized in the teaching of medical students and in the discussions of medical societies.

Injury to the head is the most common peace time form of serious trauma. Satisfactory progress in the treatment of these injuries may be

expected only from a wider employment of methods which are known to be effective but which are too frequently neglected.

Fundamental objectives in treatment are to provide competent nursing care of the unconscious patient, to prevent infection of open wounds of the scalp and brain by adequate, timely operation, and to recognize promptly by expert clinical study of the patient the presence of compressing intracranial clots. With these primary objectives kept clearly in mind, there is less need to be seriously concerned with the measurement of spinal fluid pressure, spinal drainage dehydration and other controversial methods of diagnosis and treatment.

INTERSTITIAL BRONCHOPNEUMONIA IN CHILDREN*

By JOSEPH S. WALL, M.D.
Washington, District of Columbia

Interstitial bronchopneumonia is not *per se* a specific disease entity, but because of its occurrence in rather definite sequence to infection with certain of the contagions of childhood and the clinical as well as the specific pathological picture which it presents, the subject warrants some individual consideration.

There has always been some confusion in the nomenclature of the pneumonias of children, particularly when classification is attempted upon an anatomical basis,[1] nor has there yet been evolved a satisfactory differentiation of those types, more frequent in the young, which differ in location, structural involvement, and pathological exudate, from the better defined lobar (croupous) pneumonia. Even the comparative frequency of lobar pneumonias as opposed to the generic group of bronchopneumonias, as we meet with them in young children, varies in the opinion of many writers from 1:0.5 to 1:17.[2]

Interstitial bronchopneumonia may be defined as a secondary disease in which the inflammatory process shows an affinity for the bronchial and alveolar walls, the peribronchial tissues, the interlobular septa, and the supporting structure of the lungs, with involvement of the enveloping, contiguous alveolar spaces rather than those into which the air-ways lead.

To epitomize the definition, one may with propriety call the disease "bronchiolar pneumonia," or even "peribronchitic pneumonia," both terms comprehending the essential features of the lesions.

HISTORY

To the extensive studies of William G. MacCallum[3 4] in the army camps during the World War, some of which were overwhelmed by two epidemics in quite rapid sequence, namely, measles and influenza, we as pediatricians owe not only the re-birth of interstitial bronchopneumonia from the standpoint of medical terminology, but a brilliant contribution to our knowledge of the disease, together with an interesting vista through the preceding years, even centuries, into the history of the ailment.

MacCallum,[3] through descriptions of clinical records and autopsy reports, traces the occurrence of interstitial pneumonia to the congregation of soldiers in our own country back to the birth of the republic. While he could find but scant reference to pneumonia in the Revolutionary War, the year 1812 was marked not only by an epidemic of the disease among troops, but by an extension to the civil population as well. James Mann, hospital surgeon of the Army, quoted by MacCallum,[3] published in 1816 "Medical Sketches of the Campaigns of 1812, 1813 and 1814," in which by clinical observation and autopsy he demonstrated the prevalence of pneumonia with high mortality among the troops, and states in another report from Plattsburg that "the most prevalent disease was measles, which predisposed those who had it to pneumonia."

It seems probable that measles, with its sequel of pneumonia, was also prevalent to a considerable degree in the War Between the States of 1861 to 1865, although mention of it by medical historians of both armies is largely wanting, owing to the greatly overshadowing epidemics of typhoid fever and dysentery, the scourges of that conflict.

MacCallum presents, however, interesting and intriguing evidence that interstitial pneumonia prevailed, as he was enabled to examine three specimens of lung of soldiers dying in that War which had been preserved in the Army Medical Museum at Washington and actually to demonstrate the bronchial and peribronchial lesions of the condition, as well as to stain vividly masses

---

*Read in Section on Pediatrics, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Pediatrics, Georgetown University, and the Children's Hospital, Washington, D. C.

of streptococci throughout the specimens after preservation in alcohol for a period of fifty-four years.

The troops concentrated in our camps during the World War suffered first from an extensive epidemic of measles, which secured its victims largely from the ranks of soldiers drafted from non-urban regions. The second great war scourge of influenza carried with it an appalling mortality from pneumonia, most of which was probably interstitial in type.

Peace hath her pneumonias no less than war and it falls within our province as pediatricians to encounter those diseases, prevalent mostly in childhood, which give rise to interstitial bronchopneumonia.

ETIOLOGY

Acute interstitial bronchopneumonia is almost always a secondary disease associated with or occurring in the wake of measles, whooping cough, influenza, diphtheria, less often scarlet fever, dysentery and other infections of childhood. Occasionally local throat or tracheal affections, retro-pharyngeal abscess, septic sore throat, streptococcic laryngitis, may lead to its development. It occurs more frequently following operative procedures upon the larynx, including intubation and tracheotomy, as well as the more modern tracheal suction, than it does in uncomplicated diphtheria.

Age exercises an important influence in that the predisposition to pneumonia and its incidence as a complication of the diseases named, is enhanced by tender age, children from 1 to 4 years bearing these diseases badly, and institutional children still more unfavorably.

In the course of measles and influenza the disease may occur early, even before the declination of the initial fever. Pertussis, on the other hand, shows an incidence during the third or fourth week when the most violent paroxysms occur.

The organisms found in the lesions of interstitial pneumonia both by culture and by tissue staining, the latter being much the more positive, are usually the streptococcus hemolyticus and the influenza bacillus of Pfeiffer; less often the staphylococcus, together with what are probably later invaders or stars of lesser magnitude, the pneumococcus, Friedlander's bacillus, and many others. The streptococcus seems to be the chief offender, even during epidemic occasions acquiring a specificity whereby it is able to induce interstitial pneumonia without the intervention of an antecedent contagion.

It is not improbable, however, that the streptococcus and the bacillus of influenza found commonly may in reality be secondary invaders, for in two of the antecedent diseases, measles and influenza, a filtrable virus is now largely held to be the actual excitant of the disease and the active irritant which causes the peculiar bronchial lesions of the malady under discussion.

Recent investigations tend to include pertussis within the group of virus diseases or at least as a condition in which there may be an association of virus with bacteria, a liaison which has been demonstrated to exist in a number of animal infections. Canine distemper is believed to be caused by virus plus bacillus bronchisepticus; hog cholera by virus plus bacillus suipestifer, and swine influenza by virus plus hemobacillus influenza suis.[5]

McCordock[6] has been able to demonstrate intranuclear inclusions, indicative of virus infection, in about one-third of the cases of pertussis which he has autopsied.

Rich[5] and co-workers hold that

"Whatever the agent responsible for the pulmonary inclusion bodies in pertussis may be, it is interesting to note that, even if it reaches the lung by aspiration, it may also become widely diffused throughout the body by way of the blood stream, for in three of five cases of pertussis in which we have recently found pulmonary intranuclear inclusions, precisely similar inclusions were present in the renal epithelium as well."

McCordock and Muckenfuss[7] were able to produce experimentally the exact lesions of interstitial bronchopneumonia by the injection into the trachea of rabbits of bacteriologically sterile vaccine virus (neuro-virus of Levaditi). By incorporating bacteria with virus their results were even more positive, so that they conclude:

"With the exception of lobar pneumonia, which is notoriously difficult to induce experimentally, we have been able to reproduce by the use of vaccine virus and bacteria practically every pulmonary lesion that has been described as a complication of influenza and measles. * * * Interstitial bronchopneumonia is regarded by us as the type reaction to the presence of a virus and a bacterium, but in no sense specific for a certain virus or a particular micro-organism."

Denton,[8] during a severe epidemic of measles in Panama, had the unusual opportunity of performing autopsies in the case of three children who died early in the course of the disease, three hours, eighteen hours and twenty - four

hours, respectively, after the first appearance of the rash. Extensive pulmonary involvement was found in all, including a pinkish-red or red mottling of the lungs, the mottling being due to roughly circular dark red areas about bronchial radicles of various sizes. He says:

"The areas of reaction in the lung are purely peribronchial in distribution and in many bronchioles the wall cannot be made out, for it often shades off into swollen, contiguous alveolar walls."

It would seem reasonable to believe that in the case of measles at least the disease possesses a virus or toxin or irritant which produces an early and intense reaction upon the bronchial walls, favoring the later growth of the streptococcus and other organisms, while even in the absence of the latter pulmonic infiltration may occur.

Kohn and Koiransky,[9] in an exhaustive x-ray study of the lungs of children during the progress of measles, have shown by this method of "living pathography" that measles has a selective tropism for lung structure, even in the preeruptive stage.

These investigators have demonstrated in a series of 130 cases of measles not only the frequency of changes in the lung, many of these without demonstrable physical signs, during the stage of early or full eruption, but extensive pulmonary infiltration even in the period of invasion.

The features they noted in their roentgenograms were: (1) shadows in the lung suggesting infiltration; (2) abnormal intensity of the pulmonary markings; (3) pleuro-pulmonary changes; (4) progressive and retrogressive changes in the hilar areas during the course of the disease; and (5) no deviation from the normal. In forty-four of the seventy-two cases (61 per cent) in which infiltration was observed, it was always present before or during the height of the eruption.

Abnormal intensity of the pulmonary markings was present in 80 per cent of all their cases. In the older children these markings assumed the appearance of coarse and fine linear striations radiating from the hilar regions into the pulmonary fields, but not traceable to the extreme periphery. In the younger children they found the striations not so definite. They appeared as fine beading, following, presumably, the course of the pulmonary vessels. This beading, or fine mottling, was not confluent and it never reached the density of infiltrative opacities.

It is interesting to speculate as to the possibility that this beading, observed by these writers, might correspond to the extensive beading described by MacCallum, which he ascribes to distention and thrombosis of the lymphatics.

PATHOLOGY

Delafield,[10] writing over a half century ago of the pneumonias complicating measles, whooping cough, scarlet fever and diphtheria, describes with clarity the lesions of interstitial bronchopneumonia, presenting a pathological picture so precise that his words are equally applicable to the autopsy description of the present day:

"These constitute the essential features of the lesions: a bronchitis which involves the walls of the bronchi, and a pneumonia which involves the vesicles surrounding the bronchi, and which produces changes in the walls of the vesicles as well as in their cavities, while the inflammatory products within the cavities of the vesicles are not only pus and fibrin, but also organized tissue."

Writing further of what he calls "peribronchitic pneumonia," Delafield says:

"As the inflammation goes on, the interstitial character becomes more and more marked. * * * It differs from bronchitis and from lobar pneumonia in that the inflammation effects changes in the walls of the bronchi and of the air vesicles, and this peculiar interstitial character of the process exists from the very outset. * * * The inflammation extends from the bronchi, not to the group of air vesicles into which they lead, but directly outwards to the vesicles which surround the inflamed bronchi, and in these vesicles the walls are changed. * * * The interstitial character of the inflammation is its most important feature."

Delafield concludes this interesting contribution with both an appeal and a prophecy, the latter being verified by the course of time, when he states:

"I think it is worthy of consideration whether the views which I have advanced concerning the pathology of the disease are not the true ones, namely: that the inflammation is essentially and from the outset an interstitial one, more or less complicated by other conditions."

At autopsy the lungs grossly show intensified bronchial markings. From the bronchi pus may readily be expressed, while surrounding these structures the lung is studied with nodular masses representing consolidated areas mantling the bronchi which themselves may in turn possess an inner mantle of hemorrhage, more marked in influenzal cases. The interlobular septa are greatly thickened and widened; they

frequently, as expressed by MacCallum, "stand up like low stone walls separating fields."

Both lungs, although in different degree, share in the disease process with a preponderance of lesions at the bases. Pleural involvement occurs commonly in the cases associated with streptococcic invasion and not infrequently pleurisy and empyema are encountered.

Microscopically, the cavities of the bronchioles are filled with polymorphonuclear cells and bacteria. Their walls, in which the characteristic lesions occur, are enormously thickened by infiltration with mononuclear cells which separate the mucosa from its base and filter between the connective tissue and muscle fibers. Actual breaking down of the bronchial wall by necrosis and fissuring may occur, thus readily leading to the formation of multiple abscesses and terminal bronchiectasis.

This extensive seepage of mononuclear cells into and through the bronchial walls with invasion of the contiguous air vessels and the causation of similar hypertrophic changes in the vesicular boundaries, is emphatic and characteristic.

The lumen of the air cells contains the usual blood, fibrin, epithelial and mononuclear cells, while later in the process may be observed organizing attempts with the formation of new blood vessels and connective tissue buds, often leading to permanent destruction of the lung tissue and obliteration of the air sacs.

Streptococcic infections show also a marked influence upon the lymphatics of the bronchial and septal structure, resulting in thrombosis of these vessels as well as rapid propagation of the infection to the pleural surfaces.

Influenzal poison, if sufficiently virulent, produces rapid and extensive hemorrhage and necrosis with hyaline degeneration of the bronchial terminals, emphysema, both vesicular and interstitial, and a profound poisoning of lung tissue. Lung abscesses of limited size are common and usually multiple; less frequently are seen large abscesses which are with difficulty differentiated from empyema.

An inflammatory process of such malignancy, if death does not immediately ensue, may terminate in a chronic infiltrative and organizing inflammation equally incompatible with function and with life.

SYMPTOMATOLOGY

The symptomatology of the malady resembles but does not quite coincide with the picture of primary bronchopneumonia.

The onset is usually insidious, frequently masked by the acute disease to which it is a secondary but serious factor. The temperature curve is irregular, not often sustained as in lobar pneumonia, and forms a criterion from which little can be deduced as to the severity of the disease. We have witnessed the desperate plight of these children in spite of a fever curve of but two or three degrees above normal. It is the prolongation of the febrile phase which is of greater moment than its fluctuations or elevation.

The whole course of the disease is marked by the persistence of symptoms day after day and week after week, with accompanying asthenia, emaciation, and exhaustion which too frequently result in an unfavorable termination.

Dyspnea is usually present, together with a cough, violent, excessive and exceedingly disturbing to the victim. An interpretation of the pathology of the disease indicates the cause of this perturbing symptom, especially in the early stages when the tubes are filled with muco-pus.

Pneumonia following pertussis causes the greatest distress from cough, the paroxysms of which may initiate severe cyanosis, cardiac distress, and not infrequently convulsions. Besides the latter, nervous symptoms of restlessness, insomnia, irritability and, in older children, a melancholic attitude akin to despair may be present.

Gastro-intestinal symptoms, more especially vomiting and diarrhea, heighten the distress of the child and favor a critical outcome.

After an illness of four to six weeks the child presents the appearance of pulmonary cachexia not unlike that of advanced phthisis, from which the diagnosis is often difficult. Children not showing improvement after the lapse of such a period usually succumb to the disease, although milder types, those occurring with pertussis more especially, may be prolonged for weeks and months to end in ultimate recovery.

Should recovery occur, convalescence is extremely tedious and tardy, fraught with the danger of relapse, and in those children in whom the process becomes chronic, with exten-

sive fibrosis of the lung, or severe bronchiectasis, return to normal function is impossible.

The physical signs of interstitial pneumonia are those of acute disseminated bronchopneumonia, but display a tendency to be more bizarre and changeable. Signs showing such variation and mutation, sometimes evanescence, at other times permanency, may cause confusion in diagnosis, but, at the same time, may possess a certain degree of diagnostic suggestion as pointing to the probability that interstitial pneumonia is present.

Rales alone may be heard throughout the attack, although consolidation at the bases posteriorly, often changing in extent from day to day, appearing and disappearing at the same site, upon repeated examinations may be elicited in most cases. Consolidation persisting for days and weeks, associated with rales sounding quite superficial to the listening ear, simulates almost exactly the lesions of tuberculosis; or, again, the suspicion of localized empyema may result in futile repeated punctures of the thorax for diagnostic purposes.

Diagnosis may, therefore, be difficult, but may be accomplished if one bears in mind that the disease is secondary and that its presence should be suspected in the course of childhood contagions presenting pulmonary symptoms.

PROGNOSIS

Prognosis is serious. When one realizes that a pneumonia of a widespread nature with a certain fixity and permanency of tissue response is superimposed upon an already existing disease in a young child, the danger of this particular type of pneumonia needs but little emphasis.

By far the greatest mortality is seen among the children of institutions and hospitals wherein the spread both of contagions and of interstitial pneumonia may assume epidemic proportions. Hospital and institutional statistics reveal a mortality of 75 per cent or more, nor does this figure probably encompass the fatalities from later complicating diseases in those whose pulmonary structure has been permanently damaged by the pneumonia.

TREATMENT

Treatment of interstitial bronchopneumonia is in reality an *a priori* and not an *a posteriori* problem. It should be anticipated and prevented, and in many instances prophylaxis is possible, positive and successful.

There is reason to believe that carriers of bacteria, especially of the streptococcus, may inoculate by contact others who are ill with the contagions of childhood or other infections. Isolation, with the exclusion of all but needed attendants, should be insisted upon. Isolation of the individual sick, as far as possible, during ward epidemics would prevent, to some extent at least, the dangers of cross infections.

Inasmuch as the pneumonia in question is secondary to common contagions, the prevention or modification of these becomes of prime importance.

Diphtheria can be prevented by toxoid inoculation. Should it occur, by early administration of antitoxin laryngeal involvement may be escaped, as this is the form most often giving rise to pneumonia either directly or through the traumatism of mechanical treatment.

Scarlet fever, especially in schools and institutions, may be controlled by immunization as practiced by the Dicks, while the number and severity of complications have been lessened, according to many reports, by the early institution of serum therapy in many cases.

It is our common experience that measles may be modified and robbed of its severity by the administration of immune or convalescent blood in suitable doses, properly timed in relation to exposure. More recently, the globulin fraction of placental extract as developed by McKhann has been utilized for this purpose with considerable success, although in our own hands successful modification of measles has not been as striking as with the use of whole blood.[11 12]

Pertussis may in time also be brought within the control of preventive inoculation through the use of vaccines as developed by Sauer.[13 14]

Quite recently Daughtry - Denmark[15] has shown by a study of complement-fixation methods the value of such immunizations, more especially when a vaccine of double strength is employed or when a total of 8 to 14 c. c. of the vaccine of Sauer has been administered.

The treatment of interstitial bronchopneumonia when present differs but little from that accorded the more common primary disseminated

form, a subject which lies beyond the scope of this discussion.

BIBLIOGRAPHY

1. Griffith, J. P. C.: Pneumonia in Children. Med. News, **69**:625, 1923.
2. Griffith, J. P. C.; and Mitchell, A. G.: Diseases of Children. Philadelphia: W. B. Saunders Co., 1934.
3. MacCallum, Wm. G.: The Pathology of Pneumonia in U. S. Army Camps. Monograph, Rockefeller Institute for Medical Research, 1919.
4. MacCallum, Wm. G.: Pathological Anatomy of Pneumonia Associated with Influenza. Johns Hop. Hosp. Reports, **20**: 149, 1920-21.
5. Rich, A. R., et al.: Bull. Johns Hop. Hosp., **58**:— (April) 1936.
6. McCordock, H. A.: Proc. Soc. Exp. Biol., **29**:1288, 1932.
7. McCordock, H. A.; and Muckenfuss, R. S.: The Similarity of Virus Pneumonia in Animals to Epidemic Influenza and Interstitial Bronchopneumonia in Man. Jour. Path., **9**: 221, 19—.
8. Denton, James: Pathology of Fatal Measles. Amer. Jour. Med. Sci., **169**:531 (April) 1925.
9. Kohn, J. L.; and Koiransky, H.: Successive Roentgenograms of the Chest of Children During Measles. Amer. Jour. Dis. Child., **38**:258 (Aug.) 1929.
10. Delafield, F.: Pneumonia. Med News, **14**:534, 1884.
11. McKhann, C. F.; and Chu, F. T.: Use of Placental Extract in Prevention and Modification of Measles. Amer. Jour. Dis. Child., **45**:475 (March) 1933.
12. McKhann, C. F.; Green, A. A.; and Coady, H.: Factors Influencing the Effectiveness of Placental Extract in the Prevention and Modification of Measles. Jour. Pediat., **6**: 603 (May) 1935.
13. Sauer, L.: Whooping Cough: A Study in Immunization. J.A.M.A., **100**:239 (Jan.) 1933.
14. Sauer, L.: The Known and the Unknown of Pertussis Vaccine. Amer. Jour. Pub. Health and the Nation's Health, **25**:1226 (Nov.) 1935.
15. Daughtry-Denmark, Leila: Studies in Whooping Cough. Amer. Jour. Dis. Child., **52**:587 (Sept.) 1936.

1864 Wyoming Avenue

DISCUSSION (*Abstract*)

Dr. Eugene R. Whitmore, Washington, D. C.—Interstitial bronchopneumonia is Dr. MacCallum's child, or, at least, it is his adopted child; and you see by the program that he was to open the discussion on Dr. Wall's paper. However, at the end of our pathologists' meeting in Washington on Monday, Dr. MacCallum left on a train headed South, and is probably basking in the sunshine this morning, while I am taking his place in this discussion. His gain is your great loss.

Some of us here have a vivid recollection of those World War days, when Dr. McCallum was making his basic studies on the pneumonias which complicated measles (in 1917 and 1918) and influenza (in the fall of 1918) in the army camps. I propose to look from the standpoint of the pathologist at some of the information gained from those studies and from the study of pneumonia in children.

In measles and whooping cough in children, the usual cause of death is an interstitial bronchopneumonia due to the Pfeiffer bacillus. But in the measles epidemics among the soldiers, during the War, the hemolytic streptococcus was the cause of this type of pneumonia.

Later, in the influenza epidemic, pneumonia was the usual cause of death; but the hemolytic streptococcus caused a marked edema with confluent consolidation (we spoke of the lungs "filling up") and did not cause an interstitial bronchopneumonia. On the other hand, the Pfeiffer bacillus here caused two types of pneumonia: (1) a confluent hemorrhagic pneumonia, and (2) an interstitial bronchopneumonia of the type usually seen in children following measles and whooping cough.

This difference in the type of pneumonia caused by the hemolytic streptococcus and the Pfeiffer bacillus is considered to depend on the resistance of the patient. In measles and whooping cough in children, the resistance is lowered to where the Pfeiffer bacillus can cause an interstitial pneumonia; but in measles in the soldiers, the resistance was high enough so the Pfeiffer bacillus did not gain a foothold, and the more virulent hemolytic streptococcus caused an interstitial bronchopneumonia. In the influenza epidemic, the resistance of the soldiers was lowered to where the hemolytic streptococcus always caused a severe, rapidly spreading pneumonia; while the less virulent Pfeiffer bacillus caused, in the men of lowest resistance, a hemorrhagic consolidation, and in the men with higher resistance it caused the typical bronchopneumonia seen in children.

Other organisms caused this type of pneumonia much less frequently.

Thus, the resistance of the patient, and the virulence of the organism, are two very important factors in determining the type of pneumonia caused by the hemolytic streptococcus and the Pfeiffer bacillus. A third important factor is the causative organism of the primary disease; and it seems that, as Dr. Wall has pointed out, interstitial bronchopneumonia very commonly follows a virus infection. It would take us beyond our time to discuss this combined effect of two different organisms, one a virus in this condition.

In general, the interstitial bronchopneumonia caused by the hemolytic streptococcus and the Pfeiffer bacillus is much the same; grossly there are firm yellowish-white nodules about the bronchioles, which on microscopic examination show the lumen of the bronchiole filled with polymorphonuclears, and the bronchiolar and alveolar walls thickened by infiltration of mononuclear cells, especially lymphocytes, and new growth of connective tissue, and an exudate of fibrin and polymorphonuclears in the alveoli about the nodules. But there are certain definite differences in the interstitial pneumonia caused by the two organisms: in the interstitial pneumonia due to the Pfeiffer bacillus, the lungs are dry and pale, with little exudate into the pleural cavities, and the lesions in the lungs are firm nodules which resemble tubercles; in that due to the hemolytic streptococcus the lungs are moist and dark red, with extensive pleural exudate, with more involvement of the lymphatics and more tendency to hemorrhage about the nodules in the substance of the lung.

So, under the conditions under which interstitial bronchopneumonia occurs in children, it is more likely to be due to the Pfeiffer bacillus, and so to be of the dry lung type, with little pleural exudate.

When this type of pneumonia heals, there is organization of the exudate, bronchiectasis, and proliferation of the epithelium lining of the alveoli.

CLEMATIS DERMATITIS*

By A. H. LANCASTER, M.D.
Knoxville, Tennessee

In the past few years many stimulating articles on contact dermatitis have appeared in dermatological periodicals. The clematis vine has been listed as an irritating plant by Pusey,[1] Weber,[2] Prosser White,[3] J. C. White,[4] but as yet I have been unable to find any case reports of dermatitis venenata due to clematis in the literature.

The clematis is a climbing vine found mostly in temperate zones. There are something like one hundred and fifty varieties of the vine in the entire world, but only about twenty of importance in the United States. Two varieties are particularly popular in the Southern Allegheny section, one, the Clematis Jackmanii[5] with purple flower blooming in late summer, and the other the Clematis paniculata, introduced from Japan. The latter is now the most popular in this country. The Clematis paniculata is a very hardy plant, free from plant disease, grows from twenty to twenty-five feet per season, and is green until long after the first frosts. In August and September the plant is characterized by clusters of snowy white blossoms, which adds to the beauty of the plant. It is used for covering arbors, walls and fences.

According to the textbooks on botany, the herbage of all is acrid and caustic. The juice of the plant, or the bruised plant applied to the skin, is apt to cause blisters or even ulcers, and the emanations, when it is crushed, readily make the eyes water and become inflamed. In Europe, beggars produce sores on their limbs with them purposely, so that the plant is there called beggar's-weed. An infusion of the plant in oil has been used to cure the itch, and violent inflammation of the skin has been produced by friction with it.

Lloyd writes, "in working clematis for anemonin, our hands were blistered several times."

My interest in clematis dermatitis was stimulated in 1934 with my first proven case. Since that time, keeping this plant continuously in mind when dealing with eruptions of a contact nature in the summer months, I have accumulated twelve cases. Five of those cases will be abstracted here.

Case 1.—A woman, age 47, was first seen August 2, 1934, with an erythematous vesicular eruption of the face, neck, chest, hands, forearms and arms. The eyelids were edematous and almost closed, accompanied with a conjunctivitis. Her hands were swollen to the point that she had to have assistance in dressing herself. She gave a history that recurrence of an eruption, from a mild degree to the present state, had been present for seven summers, usually beginning in May and lasting until November. A list of all vegetation in and about house and garden was obtained. Patch tests for the suspicious plants were done. The patch test for clematis produced a bulla the size of a twenty-five cent piece. The plant was removed and by use of local treatment the patient was well in three weeks and she remained free of any dermatitis during the remainder of the summer and during the summer of 1935 and 1936. History revealed that clematis vine had been on the porch for seven years.

Case 2.—A woman, age 55, was first seen November 1, 1934, with an erythematous dermatitis of the face, neck, hands, and forearms. Skin on the affected parts was weeping, crusting, and considerably infiltrated and leathery, with a history of starting in the spring and lasting until late fall, during eleven out of the previous fourteen years. During the eleven years that she had the dermatitis she lived in the same house and during the three years she was free she lived in another. History revealed that the house which she lived in during the eleven years of the eruption had a clematis vine growing on the porch; the other did not. Patch test for clematis was positive. The vine was removed and not allowed to regrow the following years and she has remained free of the eruption.

Case 3.—A man, aged 54, was seen August 27, 1934, with the following diagnosis: (1) epidermophytosis of the feet, recurrent for several summers; (2) generalized dermatitis, most severe on face, neck, ears, hands, and forearms. Ears were swollen, weeping, eyelids almost closed, neck weeping and crusted. The forearms were swollen to twice the normal size, most of which could be accounted for, as he had been scrubbing his forearms for twenty minutes daily with octagon soap and a brush. An erythematous vesicular eruption covered the entire trunk and thighs; the lower one third of the legs was swollen, weeping, with a history of the dermatitis' beginning on hands and forearms, face and neck, in the early part of June, gradually spreading until it became generalized by the middle of July. The patient was treated by the usual topical applications consisting of wet dressings in the day time, soothing lotions at night, and change of topical applications to suit the condition, at the same time looking after his general condition. Within a few days he was showing improvement, but was not completely cleared until October 22, 1934, on which date he was discharged.

The etiological agent was not ascertained at this time, but on July 10, 1935, he returned to my office with an acute and severe dermatitis of the face, neck, eyelids, ears, forearms, and lower one-third of the legs, and a mild dermatitis becoming generalized similar to the eruption of 1934, but not nearly so severe. This

*Read in Section on Dermatology and Syphilology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

attack started during the first week in June. It had all the appearance of a contact dermatitis. A close check of all vegetation about the premises revealed four suspicious plants for which he was tested. The patch test for clematis was positive. The patient, an invalid, spent much of his time on the porch which had clematis growing up by the side of it. The vine was supported by strings. History revealed that he helped direct the runners along these strings. The plant was removed and local treatment continued. The patient made rapid recovery. He went through the summer of 1936 without clematis on the premises and without the dermatitis of 1934 and 1935, but with a mild epidermophytosis of his feet and an id eruption of his hands which responded to routine therapy.

Case 4.—A woman, age 32, the daughter of a well-to-do farmer, who occupied much of her time by working in flowers, came into my office June 19, 1935, with nummular patches of vesicular dermatitis on the back of the hands, fingers, and left forearm, of three summers' duration, with a history that the eruption disappeared with the onset of cold weather and reappeared in the springtime. A list of all her flowers was obtained, six of which I suspected of being the etiological agent. On June 25, patch tests were applied on her back for these six plants. The tests were all negative except a slightly positive clematis. By use of local applications and by remaining completely away from the six suspicious plants she was completely cleared on July 9. Then tests for the suspicious plants were performed on her forearm. After the clematis test had been on eight hours, because of the pain she removed it, and cleaned the area well with alcohol. Twenty-four hours from the time the test was applied, I saw her with a bulla 3 cm. in diameter and about 6 mm. thick. The clematis was removed from the premises and she has remained well.

Case 5.—A woman, age 27, was first seen on August 7, 1935, with a dermatitis back of the right hand, outer surface of right forearm and arm, and face, of two days' duration. The eruption was vesicular on an erythematous base. Some of the vesicles were 15 mm. in diameter. She gave a history of moving one week before this started. The day before she broke out she was working in the yard getting a clematis vine started on a fence. A close survey of the yard did not yield any suspicious plants other than the clematis. Patch test was positive. The vine was removed and she has remained free of any dermatitis until the present.

Considering the cases as a group: there were nine females and three males. The youngest was 9 years old, a boy; the oldest, a woman of 57; the average age was 34. The longest duration of the dermatitis was fourteen years; the shortest, two days. The average duration was three years. The longest duration of exposure to clematis before dermatitis developed was fifteen years; the shortest exposure, one day. The average was undetermined. End results for the twelve cases were uniformly satisfactory.

In determining the etiological agent the following method of approach was used. A complete list of contact flowers, plants, vines and shrubbery of all kinds was mailed into the office by the patient. This list was checked for plants considered irritating, using the Fourth Edition of Pusey, pages 368-370, as a guide. The patient was then instructed to have someone collect a small fresh specimen of each suspected plant, put it in an envelope, label, and bring into the office for a patch test. In applying the test a small piece of leaf, approximately one centimeter square, was fastened to the skin with elastic adhesive and cellophane, especially prepared for patch testing. All tests, unless they became annoying, were left on for twenty-four hours. If not convenient for the patient to come to the office at the end of twenty-four hours, some member of the family was instructed to remove the tests and if any noticeable change had taken place in the skin the patient was asked to see me not later than forty-eight hours from the time of application. No test was considered positive unless slight vesiculation was noticeable. Many developed large bulla and two of these patients could not tolerate the patch tests for twenty-four hours, but had to remove them in eight and twelve hours respectively. Many of these patients were tested for six to eight different plants. But all cases diagnosed as a clematis dermatitis had a positive patch test for clematis with all other tests negative, and remained free of the eruption without destroying any vegetation other than the clematis plant.

Patients with a positive patch test to clematis and one or more additional plants were not considered as true clematis dermatitis and are not reported in this group because of the possibility of multiple etiological agents. From studying the botanical phase of the plant, knowing that all species have an acrid substance capable of producing ulcers, we may expect some positive reaction where the clematis is not the irritating agent. This happened in my work occasionally, but on the other hand a large number of patients with a negative patch test for clematis were positive to other vegetation, such as snow-on-the-mountain, ragweed, mint, primroses, or ivy.

From my experience with the patch test I do not believe that every case that gives a positive patch test for clematis can be considered clematis dermatitis, any more than every eruption in the patient with a four plus Wassermann can be considered luetic. We must take into consideration the clinical course and the therapeutic response or we may be misled.

Clinical Course.—Most of the patients gave a history of a recurrent summer eruption beginning in late spring or early summer and continuing through the summer up until late fall with periods of exacerbations and remissions, with the eruption beginning on the exposed parts, as hands, forearms, face an neck. All patients with the exception of two gave a definite history of being about the clematis daily for a considerable period of time before the development of the eruption. One patient, *Case 5*, and the other not reported in detail, stated that his eruption started the day following the removal of some vines from about the house in preparation for some underpinning, with a recurrence the following summer. The eruption had all the cardinal symptoms, both subjective and objective, of a contact dermatitis.

Treatment.—Of course, the first step after determining the etiological agent is removal of the cause. Then treatment of the dermatitis in the usual manner by the use of wet dressings, lotions, and x-rays in selected cases. After the acuteness has subsided soothing and stimulating ointments are used to hasten normal restoration of the skin.

BIBLIOGRAPHY

1. Pusey, W. A.: The Principles and Practice of Dermatology. Ed. 4, p. 369. New York: D. Appleton & Co., 1926.
2. Weber, Leonard F.: A List of Cutaneous Irritants. Arch. Derm. & Syph., **21**:761 (May) 1930.
3. White, R. Prosser: Occupational Affections of the Skin. Ed. 3, p. 423. New York: Paul B. Hoeber, Inc., 1931.
4. White, J. C.: Boston: Cupples & Hurd, p. 118, 1887.
5. Bailey, L. H.: Standard Cyclopedia of Horticulture, **11**:787-798. New York: Macmillan Co.

DISCUSSION (*Abstract*)

Dr. H. Ford Anderson, Washington, D. C.—If anyone before Dr. Lancaster has found a summer eczema, acute or chronic, that was patch positive to clematis, removed the plant from the environment of the patient, and had the patient completely recover and remain free from eczema, he has either failed to report it or I have been unable to find such a report in the literature. If Dr. Lancaster has had twelve such patients since 1933, I am sure most of us here have seen some patients with clematis dermatitis and have failed either to recognize it or to call the attention of the rest of us to its not uncommon occurrence.

Using the patch test as diagnostic aid for the past ten years, we have proven several single cases of plant venenata from plants to which reaction is rare. All of us have had the same experience. These rare sensitizations are important only to the dermatologic detective finding them and to the patient having them. From the standpoint of scientific reports they are only curiosities. Clematis dermatitis, according to this report, is common enough to be of practical interest to all of us.

Emphasis should be placed upon the fact, mentioned by K. Touton in Jadassohon's *Handbuch* (vol. IV/I, p. 572), that the sap of the clematis vine will cause blisters or ulcers when it touches the skin and its fumes will irritate the eyes and cause lacrimation. This sap contains anemonol, a primary irritant comparable in its vesicant action to croton oil or cantharides. Naturally, using such a vesicant, the question arises as to whether the percentage of positive patch tests should not run high. Using such a small portion of the leaf we can assume that Dr. Lancaster's patch responses were allergic, as there was a very small amount of the caustic sap present in one square centimeter of leaf. There were several patients who gave negative patch tests to clematis and positive to other plants.

A word of warning should here be inserted as to the cautious use of the patch test with such an irritating plant. In patch testing with much less irritating vegetation or chemicals, severe dermatitis, dermatitis exfoliative and to my knowledge at least one law suit have followed their use. Emphasize to all patients the importance of removing the patch before twenty-four hours when discomfort arises.

We cannot ignore the fact that in all Dr. Lancaster's cases a pruritic dermatitis was present, not a caustic burn, and when the plant was destroyed the patient in every instance promptly proceeded to get well.

Dr. Lancaster apparently has taken one more condition out of the eczema group, placed it among that of dermatitis venenata, and found the cause and cure.

THE MANAGEMENT OF CHRONIC RELAPSING AMEBIASIS*

By HEINZ G. HUMMEL, M.D.
Little Rock, Arkansas

The unsuspected and widespread infection of the population of the United States with the *E. histolytica* was demonstrated in the Chicago outbreak in 1933. This epidemic has reawakened and stimulated the interest in the many problems presented by this protean disease. At the present time we are fortunate indeed in possessing several drugs that are very effective and practically specific in the treatment of this infection.

To anyone, however, who has treated a considerable number of cases, it at once becomes apparent that a definite percentage of failures occurs, and that some of the patients utterly fail to respond. Brown[1] reports sixty-five failures, 12.4 per cent, out of a total of 523 cases treated at the Mayo Clinic from 1925 to 1935. Reed[2] finds in his experience that 80 per cent of non-dysenteric cases can be cured, and lack of cure with proper treatment is due, first, to complications of a mechanical, secondarily in-

*Read in Section on Gastroenterology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

fective or associated nature, or second, to improper treatment.

The few facts that I shall try to present to you come from an analysis of 123 cases which have come under my observation in office practice from January, 1930, to December, 1935. Sufficient time has elapsed in all of those cases to permit of definite conclusions as to the end results. Since we usually learn more from our failures, I thought to determine, as much as possible, the causes of relapse and failure of cure.

A patient was considered as having chronic relapsing amebiasis when he showed cysts or motile trophozoites of the *E. histolytica* after three courses of any drug or a combination of drugs recognized as efficient amebicides, such as chiniofon, carbarsone, vioform and emetine. The latter was used in conjunction with any of the above mentioned specifics if diarrhea or dysentery was present. Nineteen out of these 123 individuals, or 15.4 per cent, relapsed. Nine patients had four, eight had five, and two had seven relapses. Each one of these patients was told, before treatment was started, that the disease was frequently characterized by recurrences. Furthermore, the importance of rest and the necessity of monthly stool examinations was stressed. Every patient was given a detailed diet list of foods of high caloric value and of low residue, rich in vitamins.

The following symptoms were encountered in these nineteen patients:

Nine cases, or 47.3 per cent, had anorexia, nausea and a feeling of bloating after meals.

Eighteen patients, or 94.4 per cent, were colon conscious. Tenderness on pressure, borborygmi, pain, fleeting or localized, at some point in the ascending, descending or sigmoid colon, were most frequently complained of. Constipation, alternating with looseness of stools, was another outstanding symptom.

Two patients, or 10.5 per cent, had a sudden, profuse and painless hemorrhage from the bowels while going to stool late in the evening. One of those patients had been hunting all day and the other one had lifted heavy boxes during the day's work. This painless and sudden hemorrhage was the first and only symptom of a relapse, coming on after a period of quiescence and good health seven and ten months, respectively, following the last treatment.

Fifteen patients, or 78.9 per cent, had symptoms referred to the central nervous system such as marked fatigability and neurasthenia, numbness in arms and legs, insomnia, perspiration of the palms of the hands and soles of the feet, poor memory and headaches.

Three patients, or 15.7 per cent, complained of a peculiar bitter taste in the mouth. This taste was noticed only during the time of eating and during mastication, and it rapidly disappeared after specific treatment. No Vincent's infection could be demonstrated in these three individuals.

What were the causes of relapse in the nineteen patients? one may ask oneself.

I am convinced that insufficient treatment is one of the chief causes of relapse. Reed[2] says:

"A long-standing infection, especially if it has been insufficiently treated, will have qualities of resistance and relapse analogous to those seen in chronic malaria."

We treat the average patient with one or two short courses of chiniofon or carbarsone, or, as it is unfortunately still done, with emetine alone, and we find that cysts and trophozoites rapidly disappear from the dejecta. The patient is relieved quite promptly of his symptoms and is discharged as cured after one or two negative stool examinations. Here is our first pitfall. Every individual should have regular monthly stool examinations for at least six months before he is pronounced cured. It is entirely feasible that amebae may become resistant to medication in a manner similar to that in which plasmodia become resistant to quinine, or treponemata to arsenic. Colonies of amebae, as a result of insufficient treatment, may be deeply buried and surrounded by scar tissue and thus protected against the action of drugs. It is to be regretted that emetine alone is still used by many as the standard treatment for amebiasis, when we have drugs which are more efficient. It should be given only for the relief of dysentery and diarrhea. Craig,[3] in his classical monograph on amebiasis, emphasized the fact that a large number of individuals have clinical relapses after thorough treatment with emetine.

Just as in malaria, duration of treatment by prolonged and alternating medication is as important as intensity of medication. It is therefore imperative to push our treatment to the limit in order to destroy the parasites before they invade the deeper layers of the intestinal wall, particularly the submucous and muscular coats. Only thus can we prevent the formation of deep seated, burrowing ulcers and secondary pyogenic infection and embedding of the amebae

in scar tissue. Credit must be given again to Colonel Craig[3] for calling to our attention the pathology of amebiasis. Lynch[4] pointed out that associated bacterial infection in chronic amebic colitis is not infrequently an important complication which prevents cure. I agree fully with Paulson,[5] who maintains that a secondary ulcerative colitis is often the outcome of a primary invasion of the *E. histolytica.*

Coexisting infection, either in the form of focal infection or as a generalized infection, is undoubtedly another important and contributory cause of relapse. It was Bargen[6] who found that the patient suffering from ulcerative colitis will have a greater chance for cure and less danger of relapse if his foci of infection, especially in the oral cavity, are eradicated. The patient's resistance will be lowered to such an extent, when he swallows streptococci continuously and absorbs their toxins, that his defensive mechanism is handicapped in coping effectively with the amebiasis and a concomitant infection. Copeloff[7] pointed out that the greater the infection in the mouth the greater will be the irritation offered to the intestinal tract. Duke[8] states that infection with one micro-organism will lower the resistance of the host against other invaders to a degree that is by no means negligible.

Four out of the nineteen relapsing patients had infected tonsils from which foul-smelling pus could be expressed. They also had retained dental roots. Three had several non-vital teeth with apical abscesses and also a chronic maxillary sinus infection. Two individuals would not respond to specific treatment until a chronic subtertian malaria was cured, and one had undulant fever. This last patient was previously diagnosed by someone else as having intestinal tuberculosis, because she suffered from frequent attacks of diarrhea and from a low grade fever for over a year. Every one of these patients responded favorably to intensive specific treatment as soon as these coexisting infections were eradicated; and none of them has had relapses in from one to three years.

A young woman who had contracted amebiasis as a young girl in Burma, India, had five relapses, extremely small cysts and trophozoites which were not more than sixteen microns in diameter appearing from time to time in her stools. She felt perfectly well after each course of treatment, but she had recurrent mild attacks of appendicitis with fever, nausea, pain and tenderness on pressure over McBurney's point. Cysts and trophozoites appeared in her stools after these attacks. Appendectomy cured her relapsing amebiasis. The pathologist's report was amebic appendicitis.

The third factor of importance in causing relapse was improper diet and lack of rest. Although every patient was urged to rest as much as possible and stay in bed in case of dysentery, and to adhere strictly to the prescribed bland diet, one never knows if instructions are carried out implicitly, as the following case will illustrate:

W. D., 58 years old, visited with his wife the Centennial Exposition in Chicago in 1933 and stayed at the Congress Hotel. Both contracted amebiasis. The infection was not diagnosed until six weeks later. Both received a course of chiniofon in a near-by city, and both had relapses after three and four months, respectively. Physical examination revealed that the husband suffered from a severe productive cough, caused by a chronic bronchiectasis, which was verified by x-ray examination. This condition was treated by postural treatment and intramuscular medication with excellent results. Two non-vital teeth were extracted next and carbarsone 0.25 gm. three times daily for twenty days was given; but he relapsed after nine weeks. Chiniofon 0.5 gm. five times daily for twenty-four days was prescribed in conjunction with a course of emetine injections (one grain daily subcutaneously for seven days) because he developed a mild dysentery. He felt perfectly well after this treatment for three months. He returned with a complaint of anorexia, constipation, abdominal discomfort and severe exhaustion. His stools were quite tarry, strongly positive for occult blood with benzidin, and showed cysts and trophozoites. He had a moderately severe anemia with a red cell count of 3,258,000. He was quite discouraged, and so was I.

At the same time, I learned from his wife that he took strenuous calisthenic exercises every morning on a special apparatus. He had never followed his diet closely and ate coarse foods, such as celery, slaw, corn, cucumbers and hot sauces. He, furthermore, smoked four to five cigars daily. When it was explained to him that a broken colon needs as much rest as a broken leg, and that it was necessary for him to avoid coarse, irritating foods, discontinue his calisthenics and cigars and rest as much as possible, he cooperated fully. Vioform (0.25 gm. four times daily for twenty-five days) was prescribed with a rest period of one week, after which the drug was repeated in the same dosage for another twenty-five days. He was given liver extract for his anemia and large doses of bismuth subcarbonate (one heaped teaspoonful six times daily for ten days). He has not relapsed for sixteen months. Physical and physiological rest are therefore important adjuvants in the treatment of chronic relapsing amebiasis. Coarse foods and irritants should be avoided during treatment to minimize intestinal trauma.

The fourth factor influencing relapse is habitual imbibing of alcohol and tobacco in any form. Mühlens[9] pointed out that alcohol increases peristalsis and is contraindicated in intestinal amebiasis. The patient with a mild infection may be allowed to smoke moderately. But the habitual smoker will invariably smoke more than he is supposed to smoke. It has been shown in recent years that nicotine and pyridine

will cause vaso constriction in the terminal arterioles, facilitating necrosis and ulceration. Ochsner[10] and Drennen[11] have called our attention to the recurrence of peptic ulcer in habitual smokers. Friedrich[12] showed that the absorbed nicotine produces spasm of the blood vessels, as he was able to determine by capillary microscopy. One of my patients had seven relapses in spite of prolonged and repeated treatment because of his inveterate smoking and habitual drinking.

The treatment and management of relapsing amebiasis has been referred to several times in this paper. Every patient had a complete physical examination, including repeated urinalysis and at least two red cell counts and hemoglobin determinations. Stool examinations were done weekly for three months and once a month for the next six months. If a secondary anemia was present, large doses of liver extract and in some cases iron cacodylate intravenously were given. As a rule, the patient was started on chiniofon (0.5 gm. five times a day for twenty-four days) when he suffered from constipation. Since this drug usually produces more or less diarrhea, it actually helps in the elimination of the parasites. A second course of chiniofon was given after two weeks, and, if relapse occurred, carbarsone or vioform was prescribed three times daily for twenty or twenty-four days, respectively.

If the stool showed a strongly positive benzidin test for occult blood after a diet which contained neither meat nor green vegetables for three days, it was assumed that the patient had chronic indolent ulcers in his colon, and large doses of bismuth subcarbonate (a heaped teaspoonful in water six times a day for twelve days) were given to facilitate coating and healing of these ulcers. For economic reasons it was unfortunately impossible to check these cases with an x-ray examination of the colon, as Vallarino[13] and Bell[14] have done with their routine roentgen ray examinations of the colon in the study of amebiasis.

Those patients who complained of marked fatigability and anorexia were put on carbarsone (0.25 gm. three times daily for twenty days) because this drug combated quickly and effectively these symptoms and exhibited a marked tonic effect. If relapse occurred after this amebicide, chiniofon or vioform in maximum dosage was prescribed. In other words, varying the ammunition minimizes reactions to the drugs employed and seems more effective in obtaining cure. With present knowledge, the reclaiming of failures lies, therefore, in systematic and prolonged variation of treatment. If carbarsone, used alone, failed to cure, it was alternated with a course of chiniofon or vioform. If acute manifestations in the form of diarrhea or dysentery were present emetine (0.065 gm. hypodermically) simultaneously with carbarsone or the halogenated oxyquinolines by mouth were given. On cessation of the acute symptoms, emetine was stopped immediately and carbarsone or the oxyquinoline compounds were continued.

Patient 19 was treated with a new amebicide, in which the sodium sulfonate radical of chiniofon is replaced with a second iodine atom, giving the drug an iodine concentration of 63.9 per cent. We know that the greater the iodine content of an amebicide, the greater will be its amebicidal power. This new drug will have a prominent place in our armamentarium, I believe, because the results so far obtained were very satisfactory. Trophozoites and cysts disappeared rapidly (from four to five days) from the stools and disagreeable purgation, so frequently seen after the use of other oxyquinoline compounds is not complained of by the patient. The patient has not relapsed so far.

Abstinence from alcohol and tobacco are indicated in individuals who are addicted to these habit-forming stimulants. Coexisting infections, focal or general, should be looked for and eradicated. A bland high caloric low residue diet, rich in vitamins, especially A and B, is of great importance. Appendectomy, in the patient who has signs and symptoms of chronic appendicitis, must be considered in cases resistant to medical treatment. This, in general, was the treatment given to these nineteen patients with the result that sixteen are cured and three (two being habitual drinkers and heavy smokers and one having presumably a deep seated infection) still harbor *E. histolytica*.

CONCLUSION

In the words of Manson-Bahr, "The capacity for latency and relapse often exhibited by the *E. histolytica* is remarkable." Recurrences are frequent and the prospect of complete cure of chronic amebic colitis, at the present time, with any known method of treatment is uncertain. A residuum will be left incurable by any method of treatment and such cases will usually be found to harbor deep seated infection, complicated by secondary pyogenic invaders.

REFERENCES

1. Brown, Philip W.: Results and Dangers in the Treatment of Amebiasis. J.A.M.A., **105**:1319 (Oct. 26) 1935.

2. Reed, Alfred C.: Tropical Medicine in the United States, pp. 9-19. Philadelphia: J. B. Lippincott Co.
3. Craig, Chas. F.: Amebiasis and Amebic Dysentery. Baltimore: Chas. C. Thomas.
4. Lynch, K. C.: Prolonged Influences and Complications of Intestinal Amebiasis. J.A.M.A., **103**:1147, 1934.
5. Paulson, M.: The Present Status of Idiopathic Ulcerative Colitis. J.A.M.A., **101**:1687, 1933.
6. Bargen, A.: Changing Conceptions of Chronic Ulcerative Colitis. J.A.M.A., **91**:1176, 1928.
7. Copeloff, quoted from Appleton, J. L.: The Med. Jour. & Rec., March 17, 1926.
8. Duke, W. W.: Multiple Infections. J.A.M.A., **71**:1703 1919.
9. Muehlens, P.: 5 Jahre Behandlung mit Yatren 105. Arch. f. Schiffs and Tropenhygiene, H. 10, 1925.
10. Ochsner, A.; Gage, M.; and Kosoy, K.: Surg., Gyn. & Obst., **62**:—, 1936.
11. Drennen, E.: Diet and Surgery in the Cure of Gastric and Duodenal Ulcers. Sou. Med. Jour., **29**:699, 1936.
12. Friedrich, R.: Das Nikotin in der Aetiologic der Ulkuskrankheit. Arch. f. Klin. Chirurgie, **179**:9, 1934.
13. Vallarino, J. J.: Amer. Jour. Trop. Med., **5**:149, 1925.
14. Bell, J. C.: The Roentgen Ray Examination of the Colon in the Study of Amebiasis. Sou. Med. Jour., **29**:462, 1936.

DISCUSSION (*Abstract*)

Dr. Chas. F. Craig, New Orleans, La.—Dr. Hummel has contributed a very valuable and practical paper upon the management of chronic relapsing amebiasis. In this paper he has brought to our attention the symptoms present in such infections and the reasons for failure to eliminate *Endamoeba histolytica,* and has suggested methods of treatment which should prove successful in the majority of such infections.

As regards the symptoms in these relapsing cases, it is interesting to know that 47.3 per cent of the patients reported upon complained of anorexia, nausea and bloating after meals, while no less than 94.4 per cent had symptoms connected with the colon, especially pain, tenderness and gaseous disturbances, and that constipation alternating with diarrhea was the outstanding symptom. These are all symptoms common to amebiasis and frequently overlooked by the physician or attributed to some other cause. The occurrence of profuse intestinal hemorrhage in two of his cases is also of much interest because this is a very rare symptom in the experience of most observers, except in severe acute amebic dysentery.

As regards the causes for the failure of treatment, I believe that Dr. Hummel has well summarized them, but I do desire to stress, as he has, the administration of emetine alone as one of the most important causes of relapse. This drug is still widely administered as a curative one in amebiasis, despite the evidence available that it cures very few infections and should be used only to control symptoms; and, as long as it is widely used, relapsing infections in those to whom it is administered will continue numerous.

In the cases in which there have been many relapses with acute symptoms of dysentery, the prognosis as to cure with any known drug is poor, for in such cases the amebae are widely distributed in the deeper tissues of the intestine, often in nests surrounded by dense fibrous tissue, and are not reached by the specific medication. Even in cases in which no symptoms of diarrhea or dysentery have occurred, it is now well known that extensive ulceration of the bowel may be present, and may account for the chronicity or lack of response to amebicidal drugs in some of these apparently very mild infections.

Dr. Hummel has very properly called attention to the necessity of treating coexistent disease conditions, especially septic conditions, and to the adverse action of tobacco and alcohol upon amebic infections, while the importance of rest and a proper diet is well emphasized. With the drugs mentioned, chiniofon, vioform and carbarsone, I have had a favorable personal experience. From my personal experience I believe that every chronic infection with *E. histolytica* is a separate medical problem and that we must expect a certain percentage of failures in the treatment of such infections. The longer the infection has lasted, especially if active symptoms have been present, the more doubtful is the prognosis as to a cure, so that early recognition and proper treatment are of the greatest importance in amebiasis.

It is noted that in this series of cases treatment with vioform, chiniofon and carbarsone was continued for considerably longer than usual, and I should like to inquire if any toxic symptoms were observed during the time of administration.

Dr. Hummel is to be congratulated upon the excellent results that he obtained in the nineteen patients reported upon in this paper, results which were entirely due to persistence in a thoroughly scientific therapy based upon a knowledge of the pathology of amebiasis.

Dr. Hummel (closing).—What I attempted to bring out in this paper is, that our modern method of treating amebiasis is successful. However, we should be always on the lookout for relapse in every case, and eradicate coexisting infections or eliminate any factor that may lower the patient's resistance.

Regarding the question of the larger doses of carbarsone than are usually administered and any symptoms of arsenic poisoning, I wish to say that all patients were carefully watched as to appearance of pigmentation, diarrhea or abdominal pain or other signs of arsenic saturation. None of the patients who received carbarsone in the above mentioned dosage showed any untoward reaction, except one who developed a slight albuminuria. The drug was immediately stopped. Another patient developed a slight iodine rash on the twentieth day of chiniofon medication.

Amebiasis is a frequent disease, that should be looked for in any patient presenting obscure intestinal or nervous symptoms. It will be found more often, provided physicians or technicians trained in parasitology make routine stool examinations and familiarize themselves with the morphology of the *E. histolytica.* We make routine examinations of the urine and of the blood, but we neglect to do routine stool examinations. Why? Because it is messy and not exactly pleasant. Again credit should be given to Colonel Craig, who for years has called the attention of the profession to the prevalence of amebiasis, but his voice, like the voice of the prophet calling in the wilderness, has not been heard or heeded.

As to Dr. Nelson's question that English clinicians encountered a marked hypochlorhydria in patients with amebiasis and considering amebic infection the cause of this condition, I think that marked anemia, so often found in case of long-standing amebic colitis, may explain low hydrochloric acid titers.

As to the frequency of familial amebiasis, in this series there were two patients whose wives were infected with the *E. histolytica.* Repeated stool examinations showed that the wives were cured and that the husbands had relapses and not reinfections.

THE PROBLEM OF AMEBIASIS AS SEEN IN OKLAHOMA*

By WALKER MORLEDGE, M.D.
Oklahoma City, Oklahoma

This paper is based on a study of forty-six cases of amebiasis which have been treated in the State University Hospital, University of Oklahoma, during the past ten years.

Craig, in his monograph[1] on "Amebiasis and Amebic Dysentery," defines amebiasis as

> "The invasion of the tissues of man by the pathological ameba, *Endamoeba histolytica.* This invasion occurs primarily through the mucous membrane of the large intestine or much more rarely through that of the lower portion of the ileum, and symptoms of the infection vary all the way from slight digestive disturbances to the most severe symptoms of amebic dysentery, amebic abscess of the liver or other organs."

Hence, the term amebiasis includes much more than amebic dysentery, namely: invasion of the liver, lungs, brain, skin, or other organs by the *Endamoeba histolytica.* While amebiasis is generally considered a tropical infection, it was first described in 1875 by Losch, in St. Petersburg, Russia, who found motile ameba, many of them containing red blood cells, in a patient suffering from a relapsing type of dysentery.

Incidence of Infection.—In the past ten years the number of patients admitted to the University Hospital, Oklahoma City, was 48,578; and in this number the diagnosis of amebiasis has been positively made in forty-six cases, or one case in each 1,056 has suffered from amebiasis. In contrast to this rarity of amebiasis, Canavan and Hefley,[2] in the Department of Parasitology of the University of Oklahoma Medical School, have made a survey of 532 persons, consisting of medical students, food handlers, and others associated with the University Hospital. Out of 532 ordinary stool examinations, 43 were positive for either cysts of the *Endamoeba histolytica* or the ameba themselves, which is an incidence of 8.08 per cent. Out of 231 medical students, 10 stools were positive, an incidence of 4.33 per cent. Two of these students complained of symptoms which would be consistent with amebiasis. Of 81 food handlers, 6 were found to be carriers, an incidence of 7.4 per cent, and one of these complained of alternate attacks of diarrhea and constipation. These stool examinations were made in the Department of Parasitology in the University Medical School, and the investigators used special staining technic which would enable them to find cysts as well as the active ameba.

Age Incidence.—As regards the actual age incidence of infection of *Endamoeba histolytica* in the southern part of the United States, Craig states that surveys made by Faust in 1933 in New Orleans, and by Muhlens in 1931 in Tennessee, show that the height of curve for *Endamoeba histolytica* infection occurred between 26 and 30 years of age; and after 35 years of age there is a rapid decline in the incidence rate for this parasite.

In our series of cases the highest rate of infection occurred between 40 and 50 and also between 50 and 60 years of age. Our youngest patient was 12 years old; between 10 and 20 years of age we had 3 patients, 6 per cent; between 20 and 30, 7 patients, 15 per cent; between 30 and 40 years, 8 patients, 17 per cent; between 40 and 50, 11 patients, 23 per cent; between 50 and 60, also 11 patients, 23 per cent; between 60 and 70, 5 patients, approximately 10 per cent; and 1 patient, past 70, approximately 2 per cent.

Mortality.—Out of our 46 patients, 9 died in the hospital, 19.5 per cent. One patient is reported to have died a few days after returning to his home, and it was the opinion of the visiting man in this case that his death might have been due to prolonged use of emetine.

In our 46 cases, 9 were female, making it a proportion of approximately 4 males to 1 female. Among the 46 only one was a negro male. Since our ratio of admission is approximately 15 whites to 1 negro, this indicates that as far as negroes in Oklahoma are concerned there is a very low incidence of amebiasis; for in the ten years, out of 3,205 patients only one has shown amebic infection. From seven years personal medical experience in Zululand, South Africa, amebiasis is common in the native African. Both bacillary and amebic dysentery often occur and liver abscess is frequently encountered.

Evidence of Difficulty in Diagnosis or Ineffectual Treatment.—It is interesting to note the length or the duration of time of symptoms of our patients. In the history of one man, it was evident that he had suffered from unrecognized amebic infection for more than fifteen years. Five others had symptoms which would imply amebic infection of ten years duration or longer.

*Read in Section on Gastroenterology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

In eight patients the duration was from five to ten years. And in twenty-two the symptoms indicated a duration of one year or less.

The clinical records show that these patients have been treated for many and various conditions. Several had previously had diagnoses of gallstones or chronic cholecystitis; others had been treated for ulcerated colitis; several had had appendectomies, some hemorrhoidectomies, as well as treatments for other conditions referable to the gastro-intestinal tract.

The difficulty of diagnosis is shown by the number of routine examinations of stools made in the ordinary hospital clinical laboratory; for three patients, seven or more stool examinations were required to find ameba; for six patients, the ameba were not found until the sixth stool; for fourteen patients, it required three or four stool examinations; in five more, it required two examinations; and the remainder of the series, the ameba were found either at the first examination or found at the time of a proctoscopic examination when a fresh smear was made.

As Evidence of Ineffectual Treatment.—The records show that in the treatment for amebiasis, three of these patients had six hospital admissions; three had four hospital admissions; seven had two admissions; and in the remainder no record was made of previous admissions to a hospital. Of course these readmissions may have been reinfections with ameba.

Complications.—Six of our patients developed liver abscess, and in three of these the abscess ruptured to become subphrenic. In one of these patients there was no antecedent history of dysentery. The patient did remember that about three weeks before the onset of pain in his right side he had a mild attack of diarrhea, but had no recollection of ever having passed any blood in his stools. This man was an industrial case. His abscess perforated his diaphragm to become an empyema in 1934 and to date is still draining. In five patients a diagnosis of appendicitis was made while in University Hospital and each had an appendectomy. In one of these, a woman, there was a complicating hemorrhagic cyst of the ovary. One patient had an enlarged and tender liver, which according to Rogers[3] is an early stage of liver invasion. In two patients the diagnosis of pellagra was made from the skin changes and mental conditions. One patient had three severe bowel hemorrhages and later developed intestinal obstruction. The postmortem finding in this case was obstruction due to chronic amebiasis. Another patient failed to respond to treatment for amebiasis, and a diagnosis of chronic ulcerative colitis as a complication was made. Another fatal case developed partial intestinal obstruction. The postmortem findings were chronic amebiasis and polyposis. In another patient suffering from mitral stenosis and amebiasis, death was due to peripheral emboli. Another patient had chronic arthritis and died from a pulmonary embolus. There were no cases of amebic abscess of the brain, spleen, or lung. There were no perforations of the intestine or acute peritonitis, and no skin infections.

Treatment.—During all of this ten years, patients suffering from amebiasis have been treated in the University Hospital with hypodermic injections of emetine. Many also had emetine bismuth iodide by mouth. In the early part of the ten years, numerous patients were treated by intravenous injections of neoarsphenamine. Also early in the decade an often used treatment was a retention enema of kerosene, using approximately one pint of kerosene to be retained overnight. In latter years emetine by hypodermic injection has continued in use during the active stages of dysentery, followed by chiniofon, vioform, stovarsol, or carbarsone by mouth, often supplemented by bismuth. In addition to mouth treatment quinine enemas and 2 per cent carbarsone retention enemas, following a warm soda bicarbonate enema, have been used. All of our cases have been treated until the stool has been free from amebas and their cysts with the exception of the cases of pellagra, which had to be transferred to mental hospitals. A useful form of treatment in patients who relapse after treatment by the usual therapy method is ipecac through the transduodenal tube as described by Andresen.[4] In brief, the patient is put on a small residue diet. After three days of this diet, in the morning before any breakfast, a regulation duodenal tube is passed in the duodenum and its location is determined preferably by x-ray. Pyloric closure is encouraged by giving four or five ounces of cold milk; following this 500 c. c. of a 10 per cent solution of sodium and magnesium sulphate warmed to body temperature is allowed to run slowly through the tube into the duodenum. This usually produces a copious, watery evacuation in from twenty to thirty minutes and can be shown to clean up ulcer bases very satisfactorily. Twenty minutes after the administration of the hypertonic salt

solution, there is poured down the tube a suspension of one dram of ipecac in 50 c. c. of plain warm water and this is followed by 50 c. c. more of water. The tube is left *in situ* for an hour to prevent regurgitation of ipecac in the stomach. About one and one-half hours after the ipecac, the patient may resume his feeding. This procedure is followed daily for seven days.

The problems associated with amebiasis may be grouped under four headings:

(1) Detection of ameba in patients suffering from indigestion and in carriers, as well as those having amebic dysentery or the more serious liver abscess.

(2) The proper treatment of the patient in whom amebiasis is detected.

(3) The public health problem associated with food handlers.

(4) Amebiasis in its relation to industry and legal medicine.

(1) *Amebiasis in the Carrier and Patients Suffering from Chronic Indigestion.*—Craig, in his monograph, states that the carrier suffers from amebiasis, and that the host simply has compromised with the invader; that the invader causes some destruction of tissue, yet his host's resistance is strong enough to prevent the onset of actual dysentery. There is no such thing as a healthy carrier of *Endamoeba histolytica.* In Craig's experience, 65 per cent of carriers have symptoms referable to their infection, and these symptoms disappeared after the elimination of the parasite. He groups the symptoms under those of the gastro-intestinal tract, the circulatory, and the nervous system. The symptoms often noticed in connection under those of the gastro-intestinal tract are constipation, evanescent attacks of diarrhea, colicky pains in the lower abdomen or the right ileac region, anorexia or a capricious appetite, gaseous distention of the abdomen after eating, gaseous eructations, and slight nausea before eating or directly afterward. The symptoms most often noted in the nervous system are neuralgic pains in the lower abdomen, back or legs, dull frontal headache, sleepiness or disturbed slumber, poor memory and lack of ambition, dull aching in the muscles of the legs, especially upon waking in the morning, and a constant or occasional aching in the lower lumbar region. The symptoms noted in the circulatory system are an irritable pulse, arrhythmia, vasomotor disturbance as flushing of the skin, excessive perspiration of the hands and feet, and tachycardia.

The physical signs in carriers are underweight, a sallow skin, slight anemia, irritable pulse, tenderness in the right iliac fossa, distention of the abdomen, and in some cases tenderness over the liver. Many patients with complaints like these appear in our offices and dispensaries and after a routine workout and negative stool examination are dismissed with a diagnosis of nervous indigestion or spastic colitis.

Every case of bloody diarrhea requires a stool examination for accurate diagnosis. Magarth[5] states:

> "It is agreed by experts on the subject that absolute diagnosis of amebiasis is accomplished only when *Endamoeba histolytica* has been identified in the stool, tissue, or bodily discharges. Seventy-five per cent of infestations with *Endamoeba histolytica* can be found by examining a single stool following catharsis with magnesium sulphate, whereas only a third of the infestations will be found by examining a single formed stool. It will require from eight to ten formed stools to establish the same number of infestations as three stools following catharsis."

The character of the stool is of some help in diagnosis; a partly formed or semifluid stool containing bloody mucus, which under the microscope shows many red blood cells, is suggestive of amebic dysentery; a liquid stool with mucus and flakes of pus, containing many white blood cells and few red blood cells is more likely a bacillary infection. If any ameba containing red blood cells is found, Magarth states one may with assurance call it *Endamoeba histolytica.* All authorities stress the importance of having the liquid stool kept warm and having the examination made immediately after the stool is passed by the patient, hence for an accurate diagnosis the nursing force must cooperate with the laboratory worker and both must give prompt service in order that the diagnosis may be accurate. A proctoscopic examination may reveal three main types of early lesions (Meleney):[6] the first is a shallow ulceration of the mucosa, surrounded by a narrow ring of hyperemia. The second is a diffuse granular appearance of the mucosa representing many points of invasion of the ameba into the glands without visible ulceration. The third and the most common in man is a sharply circumscribed nodular projection of the mucosa with a small depressed yellow opening in the center surrounded by a hyperemic ring and leading into a cavity containing gelatinous material. Larger ulcers vary in size, shape, and depth. Their edges are raised and overhanging and the base consists of mucoid material covering the necrotic

submucosa or the muscular coat of the intestine. When ulceration is extensive, there is generally a thickening of the wall of the colon; but if the lesions are discrete, the appearance of the intestines between them may be normal. If bloody mucous or mucoid material can be obtained from the wall of the colon by a proctoscope and a saline emulsion of this on a warm slide be examined immediately under the microscope, it is the most effective procedure to find ameba. It is, I am sure, the experience of many physicians that in patients with vague indigestion suspected of harboring amebiasis and parasites, often the laboratory report is "no parasites found." And yet in the light of the multitude of carriers found by competent investigators, it is certain that we must be missing many cases which harbor this infection. The physician must insist upon the prompt and adequate examination of stools, and especially a fresh warm stool passed after saline catharsis, or do a proctoscopic examination.

In a patient having a bloody diarrhea, with symptoms suggestive of amebiasis and yet with a negative stool report, the physician is justified in trying the therapeutic test with emetine for four or five days; emetine will not cure amebiasis, but it will cause a marked improvement in symptoms and thus help to differentiate from non-specific ulcerative colitis. Its use must not be too long continued because of its dangerous toxic effect on the heart.

(2) *Treatment.*—In our series of cases the patients have relapsed after treatment by emetine, carbarsone, or stovarsol, and carbarsone or quinine enemas; hence the perfect treatment has not yet been found. However, we have very valuable drugs, and it is necessary to observe our patients repeatedly to make sure they do not relapse.

(3) The problem of the food handler is a difficult one. The first essential is the recognition by the physician and the public health officers that amebiasis is a common infection in this country. And we can at least insist that the food handlers in our hospitals have a stool examination to rule out the presence of carriers in the institutions of healing.

(4) *Amebiasis in Its Relation to Forensic and Industrial Medicine.*—One of our patients in our series had an injury to his side in 1930, resulting in broken ribs. Two years later, with practically no history of indigestion, he developed a liver abscess which became a sulphrenic abscess and later perforated the diaphragm. This abscess is still draining. The question arose in court: what was the relation of his previous injury to the present condition? It is the opinion of many writers on amebiasis that liver abscess follows within a few weeks the initial infection of the ameba in the intestinal tract and that a predisposing cause is trauma. No record has been found of a damage suit in Oklahoma against an institution because of infection with amebiasis from food served.

SUMMARY

(1) In only one patient in each 1,056 at University Hospital has a definite diagnosis of amebiasis been made, yet in an ordinary stool survey 8.08 per cent of persons associated with the hospital and medical school harbor ameba, which would imply that many infections have been missed by the laboratory technician and the physician. We need to become more aware of amebiasis.

(2) We have valuable drugs with which to treat amebiasis, but one course of treatment is often ineffectual.

(3) Amebiasis can be a problem in industrial medicine.

REFERENCES

1. Craig: Amebiasis and Amebic Dysentery, 1934.
2. Canavan and Hefley: Incomplete Data to be published.
3. Rogers, L.: Tropical Medicine, 1930.
4. Andresen, A. F. R.: Amebic Dysentery. Amer. Jour. Trop. Med., **6**:119, 1926.
5. Magarth, Thos. B.: Laboratory Diagnosis of Amebiasis. J.A.M.A., **103**:1218, ——.
6. Meleney, Henry E.: Pathology of Amebiasis. J.A.M.A., **103**:1213, ——.

DISCUSSION (*Abstract*)

Dr. William Calvert Chaney, Memphis Tenn.—By analyzing statistics available in the University Hospital, Oklahoma City, Dr. Morledge has shown that a great many cases of amebiasis are being overlooked. All of us when we return to our homes should make similar investigations in our city hospitals. Such a study impresses very forcefully upon the city authorities the great need of trying to control this serious disease.

We are reminded that there is no such condition as a "carrier," but that all these people are sufferers of the infestation.

As Dr. Morledge has said, one course of treatment is not sufficient. We should keep up with the patients, making them return for periodic stool examinations.

Probably one of the most valuable points brought out in Dr. Morledge's paper is his plea for thorough examinations of all handlers of food. That is where public health authorities must strike the heaviest blow if we are ever to control this disease. Educate the public as to to the dangers of this disease and how it is spread and they will then see to it that all handlers of food are made to have stool examinations.

DUODENAL DIVERTICULA*

By J. A. BEALS, M.D.
Greenville, Mississippi

Diverticulum of the duodenum is no longer considered a rarity by roentgenologists. Clinicians and surgeons have been justifiably skeptical as to the significance of most of these conditions, although there seems to be a growing belief that sometimes they account for troublesome symptoms of indigestion and in rare instances they may be of grave import.

This paper is based upon the clinical, x-ray and laboratory records of 41 cases of duodenal diverticulum, most of them personally examined roentgenologically by the writer. Only one case was verified by operation. Since the subject of duodenal diverticula has been considered fully, and the literature reviewed recently by Edwards,[8 7] Horton and Mueller,[16] (1933), Lockhart[21] (1931), Odgers[26] (1930), and Cryderman[6] (1927), these records will be considered only as they confirm, contradict, or supplement the opinions of others.

Frequency.—The author's cases, 41 in number, are assumed to be of the "acquired" type of "mucosal hernias." They represent 2.2 per cent of 1,887 consecutive roentgen examinations of the stomach and duodenum of adults. This is in general agreement with most of the roentgenological series. However, Rankin and Martin[27] say that at the Mayo Clinic, 1927-1931, among 72,715 x-ray examinations only 111 cases were observed and considered large enough to merit reporting.

The autopsy reports quoted by Odgers[26] give percentages similar to the roentgen series. Recently Grant[13] reported the demonstration of 11.3 per cent among 133 dissecting room cadavers.

Age.—It is well known that diverticula of the type under discussion are rare before the age of 30, uncommon before 40, and their incidence increases rapidly after the age of 50. The average age of 34 patients of this series was 53.3 years: men, 55; women, 51.

An exceptional case was that of an undoubted diverticulum of the second portion in a girl of 16 years. So far as I can learn this is the youngest case reported.

Sex.—There is some question as to the predominance of diverticula in either sex. Odgers collected 263 cases, finding 112 men and 151 women. Most of the reported series except Lawson's[20] do not relate the sex incidence to that found in the whole series from which the diverticulum cases are taken. In this series there were 28 women, representing 2.7 per cent of all women examined, and 13 men, representing 1.8 per cent of the men examined. This difference does not seem significant considering the small number of diverticulum cases.

Multiple Diverticula.—Most of the recorded series show a few cases having two, three or more diverticula. Four of the present series had two diverticula. Two of these cases had a diverticulum in the second plus another in the third portion of the duodenum, while each of the two additional cases had two diverticula in the third portion. It is interesting to note that all four cases of double diverticula had one or both of them in the third portion, and that in each instance they were located at the duodeno-jejunal junction.

Location of Diverticulum.—Several reports, especially early ones (Case,[3] Cole and Roberts,[4] Andrews,[2] Herbst[15]), include diverticulum of the first portion of the duodenum. It is now realized, however, that nearly all of these are secondary diverticula, usually resulting from ulcer. None of the present series are of the first portion although two striking examples were encountered.

Forty-five diverticula were encountered, all arising from the concave inner border of the duodenum. Twenty-eight or 62 per cent of these were located in the second portion of the duodenum. Some may represent filling of the ampulla of Vater. I know of no roentgenologic distinction that can be made with certainty and Case,[3] Heacock,[14] Friedenwald and Feldman,[10] and Edwards[7] agree in this. The proportion, 62 per cent, is less than occurred in the 280 collected roentgen cases of Edwards,[7] who found 73 per cent and the autopsy series of Horton and Mueller,[16] who found 83 per cent in 122 subjects.

Seventeen diverticula of this series occurred in the third portion of the duodenum. Ten of them, two being double, occurred quite near the duodeno-jejunal junction.

Size of Diverticulum.—Case[3] is one of the few authors who measured the shadow. His 85 diverticula had an average diameter of 2.8 cm.

*Read in Section on Radiology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

Gibbon's[12] cases measured between 1 and 9 cm.

The average size of the 45 diverticula of this series was 14x20 mm., or, deducting 20 per cent for magnification of the image due to projection on the film, the actual size was about 10x15 mm. The smallest estimated true measurement was 4x6 mm., the largest 29x31 mm. Those of the second portion averaged 9x13 mm., while those of the third averaged 14x19 mm. This is in agreement with the measurements of Horton and Mueller in their 122 anatomic specimens. Generally their shape was oval; all possessed a constricted neck.

Association with Other Diverticula.—None of these duodenal diverticula occurred among the few cases on file showing diverticulum of the esophagus, stomach or jejunum and ileum.

The association with diverticula of the colon has been noted many times (Lawson,[20] Case,[3] Horton and Mueller,[16] Jenkinson,[17] Rankin[27]), although Odgers[26] considers the coexistence only occasional. In this series 19 of the 41 cases of duodenal diverticulum received an examination of the colon by barium enema. Five of these, or 26 per cent, showed diverticula of the colon. During the same time 1,064 other patients were examined by barium enema and diverticula were demonstrated in 47, or only 4.4 per cent.

Association of Peptic Ulcer.—Several authors have remarked upon the association of ulcer with duodenal diverticulum, although not always excluding from their consideration the secondary diverticula of the bulb, or relying on more than clinical evidence for the diagnosis of ulcer. Friedenwald and Feldman[10] report 21 per cent, and Riecker[28] 35 per cent of their cases as having associated ulcer. Horton and Mueller[16] found evidence of chronic or healed ulcer in 13 per cent of their autopsy series and say this is about the usual proportion found in autopsies on subjects which do not have diverticulum.

I wish to make no claim for the complete accuracy of the negative roentgen diagnosis of ulcer, but in this series only 4, or 10 per cent of the diverticulum cases, showed positive roentgen signs of ulcer. Each instance was of duodenal ulcer. During the same time a nearly identical proportion, 9.5 per cent, of 1,846 other examinations showed ulcer of the duodenum or stomach.

Etiology, Increased Intraduodenal Pressure.—The effort to explain the etiology of these diverticula has resulted in somewhat labored discussion. The walls of the duodenum are known to possess points of lowered resistance where they are traversed by the bile and the pancreatic ducts and by the blood vessels, and where islands of pancreatic tissue have been displaced during development. It is assumed that an increased intraduodenal pressure acts upon these weak points in the duodenal wall to cause a herniation of the mucosa.

While this assumption of increased pressure may be hard to abandon, the evidence is rather to the contrary. Edwards[7] was unable to demonstrate an increase experimentally. Odgers[26] reviewed some of the literature on duodenal dilatation and did not find that this condition, wherein the pressure is manifestly increased, was accompanied by diverticulum.

In this series of 41 cases, none showed any remarkable degree of duodenal ileus, although moderate or marked ileus was noted 24 times among 1,846 other cases examined.

Bearing on this point is the notation that 7 of the 41 cases of this series were of hyposthetic habitus, with low lying "ptotic" stomach, a type generally known to be subject to ileomesenteric drag and duodenal ileus. I believe the proportion is no greater than is generally encountered in gastro-intestinal series.

Gastric Acidity.—Friedenwald and Feldman[10] found hypo-acidity in 20 per cent of their cases and hyperacidity in 32.5 per cent. In the present series there were 34 patients who had one or more gastric analyses, usually by the fractional method. Six of these showed no free hydrochloric acid and nine showed no hydrochloric titration above 25. The proportion of subacid cases, 44 per cent, was surprising. Seven of the subacid group had normal cholecystographic findings.

Four patients had definite hyperchlorhydria. These were the four ulcer cases.

Symptoms.—A sufficient number of duodenal diverticula have been removed surgically (Case,[3] Rankin,[27] Morley,[24] Gask,[11] Kellogg,[18] and Larimore and Graham[19]) and examined at autopsy (Horton and Mueller,[16] Nagel,[25] and Herbst[15]) to prove they rarely produce such serious consequences as the obstruction of bile or pancreatic ducts or the duodenum; neither is diverticulitis, peridiverticulitis or abscess of frequent occurrence. The great majority that have been examined histologically show no evidence of present or past inflammation.

No clear-cut symptom complex has been adduced. Nearly everyone who has written on the

subject reiterates the statement that symptoms resemble those of ulcer, cholecystitis or pancreatitis.

The case records of the 41 patients of this series were analyzed with the following results:

Three histories are lost or incomplete.

The remaining 38 cases could be divided into three groups. (1) Digestive disturbance was a minor factor in nine cases. The recorded diagnoses were such as nephritis, myocardial insufficiency and migraine.

(2) There were four definite ulcer cases with typical ulcer records.

(3) The remaining 25 patients presented a variety of symptoms, generally extending over a period of years.

Nausea, vomiting or both were mentioned 16 times.

Upper abdominal pain or tenderness was mentioned 11 times.

Upper abdominal fullness or distress was mentioned 11 times.

Frequent belching was mentioned 11 times.

Five patients gave a history of previous attacks presumed to be of gallstone colic, yet three of these had normal cholecystographic findings.

Other complaints mentioned were regurgitation, heartburn, headaches, vertigo, hiccough, and jaundice.

Periodicity of symptoms and relief by food or alkalies was mentioned by only one patient.

In general, I believe these records can all be classified as in keeping with chronic disease of the biliary tract. This assumption is strengthened by the fact that six patients had had a cholecystectomy some months or years previously. Seven additional cases had cholecystographic evidence of gallbladder disease. The frequent association of cholecystitis has been remarked by Case, Heacock and others.

There are 10 patients, 25 per cent of this series of 41, with fairly complete records which show nothing that accounts for the patient's digestive disorder other than the roentgen finding of a diverticulum. Gibbon[12] found this to be true in 14 of his 20 cases and Edwards[8] in 9 of his 27 cases. The proportion seems significant even though we grant that some of these patients may have other undiagnosed or undiagnosable causes for their symptoms.

Significance of X-Ray Findings.—Many authors (Edwards,[7] Case,[3] Sullivan,[30] MacLean,[22] Jenkinson[17] and Unger[31]) feel that prolonged retention of barium in a diverticulum is significant of their clinical importance, although Heacock[14] questions this. So far as I know, no one has statistically correlated this finding with the symptoms. The observations necessary to establish retention were unfortunately not made for this series.

Local Tenderness.—Tenderness localized to the diverticulum by palpation during fluoroscopy is said by Abell,[1] Unger and Poppel,[31] Case,[3] MacLean,[22] and McQuay[23] to indicate that diverticulitis is present. This series affords no light upon this point, for, while the writer has encountered tenderness he has seldom been sure of its specific localization to so small an area as a diverticulum.

Multiple X-Ray Examinations.—There were fourteen cases of this series which received more than one examination of the stomach and duodenum. The interval between examinations was a few days to five years. In five instances an examination one to five years earlier failed to result in a diagnosis of diverticulum. A review of the films revealed that in one instance the diverticulum was demonstrated and should not have been missed. In two others a questionable shadow should have led to re-examination. In two there were no signs of diverticulum in the earlier examination. In two additional cases the diverticulum was demonstrated only at a second examination following the first by a few days. In the remaining seven cases the diagnosis was made at each of the two or more examinations.

The 14 cases receiving two or more examinations is 34 per cent of the 41 diverticulum cases. During the same period more than one examination was made on 7 per cent of 1,846 other patients. This seems to signify either that the more one searches the more diverticula he discovers or that these patients are among the more insistent and persistent sufferers from digestive complaints. Perhaps both factors are operative.

Late or Difficult Filling.—It has been a frequent experience of roentgenologists that a diverticulum was unsuspected until its shadow appeared on the film made three, six or twenty-four hours after the stomach examination. Costello[5] has made special mention of the difficulty with which some of his diverticula were demonstrated.

In this series there were 15 cases in which the diverticulum was demonstrated late, that is, only at a second examination, or else it failed

to appear during the fluoroscopic examination and in the first films of the radiographic examination. Until the histories were reviewed the writer believed that such delay or difficulty indicated the dependence of symptoms upon the diverticulum and was encountered in those patients with the most pronounced complaint. This opinion was not borne out, for, of the 15 cases of late filling, 4 had minor digestive troubles, 2 were ulcer cases, 5 gave evidence of past or present disease of the gallbladder, and only 4 belonged to the group of 10 in which the symptoms could be explained only or best by the presence of diverticulum.

Irregularity of Contour.—The impression was also held that irregularity of contour of the diverticulum shadow might indicate diverticulitis or possibly penetrating ulcer distal to the bulb and thereby be related to the severity of symptoms. There were 12 instances of irregular contour. Only five of these fell into the group of apparently symptomatic diverticulum cases. While this may be suggestive, the number involved is too small for real significance.

CONCLUSIONS

The author's series of 41 cases of diverticulum of the duodenum is in general agreement with most of the published series as to the incidence of the condition, age and sex distribution, size and location of the diverticulum and their association with diverticula of the colon.

The series shows no special association with peptic ulcer. Fifteen cases, or 36 per cent, had received surgical treatment for gallbladder disease or had roentgenological evidence of gallbladder disease. No case of pancreatitis was encountered. A surprising proportion, 44 per cent, had absent or reduced free hydrochloric acid. The absence of duodenal ileus is noted, which tends to deny the necessity for *increased* intraduodenal pressure as a factor in the etiology of these interesting pouches.

Analysis of the histories shows that 9 patients certainly had no troublesome digestive symptoms. It is arguable that the diverticulum contributed to the development or the postoperative continuance of biliary disease in 15 cases, but this contention is not made here. There were 10 cases, one-fourth of the entire series, with nothing in their records to account for troublesome digestive symptoms other than the presence of a diverticulum.

Late or difficult barium filling and irregularity of the shadow could not be related to the latter group of 10 apparently symptomatic diverticulum cases.

Consideration of treatment has been purposely omitted. However, one cannot escape the conviction that if duodenal diverticula were as accessible to the surgeon as is the appendix we should soon learn from him whether or not resection of the pouch would relieve a considerable number of patients of their chronic and intractable digestive complaints which are not well explained except by the mere presence of a diverticulum.

BIBLIOGRAPHY

1. Abell, I.: The Diagnosis and Treatment of Diverticulitis and Diverticulosis. Surg., Gyn. & Obst., **60**:370-378 (Feb.) 1935.
2. Andrews, A. E.: Duodenal Diverticula. J.A.M.A., **77**:1309-1311 (Oct. 22) 1921.
3. Case, J. T.: Diverticula of Small Intestine, Other Than Meckel's Diverticulum. J.A.M.A., **75**:1463-1470 (Nov. 27) 1920.
4. Cole and Roberts: Surg., Gyn. & Obst., **13**:376, 1920.
5. Costello, C. D.: Duodenal Diverticula. Brit. Jour Radiol., **6**:577-587 (Oct.) 1933.
6. Cryderman, W. J.: Duodenal Diverticulum. Canad. Med. Assn. Jour., **17**:1455-1461 (Dec.) 1927.
7. Edwards, H. C.: Diverticula of the Duodenum. Surg, Gyn. & Obst., **60**:946-965 (May) 1935.
8. Edwards, H. C.: Diverticulum of the Duodenum and Jejunum. Lancet, **1**:169-174 (Jan. 27) 1934.
9. Fletcher, H. N.; and Castledon, L. I. M.: Three Cases of Duodenal Diverticulum Removed by Operation. Brit. Jour. Surg., **23**:776-786 (April) 1936.
10. Friedenwald, J. A.; and Feldman, M.: The Roentgenologic Significance of Filling of the Ampulla of Vater. Radiol., **21**:162-167 (Aug.) 1933.
11. Gask, G. E.: St. Barth. Hosp. Report, **67**:122-133, 1929.
12. Gibbon, W. H.: Diverticula of the Duodenum. Radiol., **21**:491-494 (Nov.) 1933.
13. Grant, J. C. B.: On the Frequency and Age Incidence of Duodenal Diverticula. Canad. Med. Assn. Jour., **33**:258-262 (Sept.) 1935.
14. Heacock, C. H.: Diverticulum of the Duodenum. Sou. Med. Jour., **22**:348-350 (April) 1929.
15. Herbst, W. P.: Diverticula of the Duodenum. Minn. Med., **10**:364-368 (June) 1927.
16. Horton, B. T.; and Mueller, S. C.: Duodenal Diverticula. Arch. Surg., **26**:1010-1034 (June) 1933.
17. Jenkinson, E. L.: Diverticula of the Small Bowel. Radiol., **12**:100-105 (Feb.) 1929.
18. Kellogg, E. L.; and Kellogg, W. A.: Duodenal Diverticula. Internatl. Clin., **4**:18-27 (Dec.) 1931.
19. Larimore, J. W.; and Graham, E. A.: Diverticula and Duplicature of the Duodenum. Surg., Gyn. & Obst., **45**:257-265 (Sept.) 1927.
20. Lawson, J. D.: Duodenal Diverticulosis. Amer. Jour. Roentgenol., **34**:610-616 (Nov.) 1935.
21. Lockhart, R. H.: Duodenal Diverticula. Yale Jour. Biol. & Med., **3**:505-513 (July) 1931.
22. MacLean, N. J.: Diverticulum of the Duodenum. Surg., Gyn. & Obst., **37**:6-13 (July) 1923.
23. McQuay, R. W.: Duodenal Diverticula and Their Surgical Treatment. Ann. Surg., **89**:36-47 (Jan.) 1929.
24. Morley, J.: Diverticulosis and Diverticulitis of the Duodenum and Colon. Liverpool Med.-Chir. Jour., **43**:pt. 1, pp. 67-77, 1935.
25. Nagel, G. W.: Unusual Conditions in the Duodenum and Their Significance. Arch. Surg., **2**:529-539 (Oct.) 1925.
26. Odgers, P. N. B.: Duodenal Diverticulosis. Brit. Jour. Surg., **17**:592-618 (April) 1930.
27. Rankin, F. W.; and Martin, W. J., Jr.: Diverticula of the Small Bowel. Ann. Surg. (Dec.) 1934.
28. Riecker, H. H.: A Clinical Interpretation of Duodenal Diverticulum. Amer. Jour. Digest., Dis. & Nutrit., **2**:217-220 (June) 1935.
29. Scott, S. G.: Diverticula of the Duodenum. Brit. Med. Jour., pp. 346-347 (Feb. 28) 1931.
30. Sullivan, R. P.: Discussion of Paper of F. L. Barnes. Amer. Jour. Surg., **20**:328-340 (May) 1933.
31. Unger, A. S.; and Poppel, M. H.: Duodenal Diverticula. Radiol., **26**:601-604 (May) 1936.

DISCUSSION (*Abstract*)

Dr. Franklin B. Bogart, Chattanooga, Tenn.—When I was asked to take part in this discussion I had the impression that the incidence of duodenal diverticula in many cases was less than is usually reported. A review of my gastro-intestinal cases, however, showed that the incidence of this lesion approached that reported by most other workers, namely, 1 per cent.

The majority of my cases have occurred in persons of middle age or older and while not all of the patients could be classed as cachectic, most of them were physically far below the average. While this does suggest that the acquired type of diverticula is most frequently discovered in older persons and debilitated individuals, it does not necessarily mean that they occur in those groups of persons with greater frequency than in younger individuals. Young men and women are not subjected to radiographic examinations of the gastro-intestinal tract as frequently as older persons, consequently diverticula will not be discovered as frequently, for it is certainly true that in most cases they are discovered accidentally.

There are no characteristic symptoms which they produce and as a result their presence is not usually suspected until the x-ray examination is made.

I should not be inclined to attach much significance to the fact that 44 per cent of Dr. Beals' cases showed reduced or absent hydrochloric acid in the gastric contents. The impression has grown with me that absence or marked reduction in the free hydrochloric acid content of the stomach secretions occurs rather frequently and that it may be associated with a considerable group of conditions. This is particularly true of persons of middle age or older and in those who are below the average physically.

Dr. Charles A. Waters, Baltimore, Md.—Duodenal diverticulum should be considered from three standpoints: (1) roentgenologic, (2) clinical, and (3) surgical.

From the roentgenologic standpoint, diverticulum of the duodenum is a relatively common finding and undoubtedly in the large majority of cases unaccompanied by any symptoms. However, in the majority of these cases one must realize that the patient in whom duodenal diverticula are found have been referred on account of some form of gastro-intestinal ailment, and an even more careful search for a hidden lesion should be made.

Clinically it seems that patients with duodenal diverticula complain of two types of symptoms: first, those with typical ulcer symptoms; and, secondly, those in which discomfort and pain come on immediately after eating.

From talking with a number of my surgical confreres I have felt that the symptoms were in the majority of cases due to distention. It seems to make little difference whether the diverticulum is embedded in the head of the pancreas or whether it is free. A surgeon reported the following case:

One patient with ulcer symptoms was operated upon and the sac resected. The other was placed on bland diets, antispasmodics and rest. Both got well in about the same length of time. The case operated upon failed to reveal an ulcer in the sac.

In my own personal experience I have seen only one case in which I felt reasonably sure that an ulcer was present in the sac. There was no operation. Recovery followed medical ulcer therapy.

There is one warning I should again like to stress in this discussion. As I have already said, these patients are being studied, roentgenologically, on account of some abdominal discomfort and one should not jump at the conclusion that a diverticulum of the duodenum, if found, is the cause and seat of the trouble. I should like to report the following incident. A very stout, elderly woman with marked gastro-intestinal bleeding was referred for gastro-intestinal study. She had a short esophagus, partial herniation of the cardiac end of the stomach through the diaphragmatic hiatus, but no gross lesion. The only finding was a duodenal diverticulum. Exploration revealed no sign of a lesion. Postoperative rest followed and the patient recovered. A year later a similar attack occurred and another x-ray examination revealed a small ulcer at the site of the diaphragmatic opening. Medical ulcer therapy again effected a cure. Therefore, it seems to me that when one finds only diverticula of the duodenum in patients with gastro-intestinal symptoms, an even more careful and intensive search should be made for an explanation elsewhere in the gastro-intestinal tract.

THE DIAGNOSIS AND TREATMENT OF CONDITIONS SIMULATING SINUS DISEASE*

By HARRY R. SLACK, JR., M.D.
Baltimore, Maryland

During the past few years the paranasal sinuses have been the subject of much discussion in medical literature. All manner of therapeutic agents from diet to climate have been advocated for their treatment and a great many modifications of the generally accepted operative procedures have been recommended, many of them quite ingenious and useful. The widely divergent opinion and varied advice is a fair indication of the importance of this problem. It is not the purpose of this paper to bring before you any pet operative technic or new therapeutic measures, but rather to call to your attention a few practical points mainly in the field of diagnosis.

Many times the specialist is consulted about "sinus trouble" by patients coming of their own accord or referred by the family physician, when in reality the symptoms are caused by some general systemic disorder or certain local conditions entirely unrelated to the paranasal sinuses. We propose to enumerate briefly some of the conditions that most commonly lead to confusion,

*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

and to offer suggestions as to how the pitfalls may be avoided. All of us have seen too many mutilated nasal cavities that furnish an added source of irritation to the poor sufferer and tend to destroy his or her faith in the medical profession.

Before instituting any therapeutic measures or advising operative procedures it is absolutely essential that the patient be given a thorough general medical examination and diagnostic study. We need not here relate in detail all the necessary steps, but briefly draw your attention to some more important investigations: (1) a very thorough and careful history which follows up all possible leads. (2) A complete physical examination by a qualified internist, and this should include Wassermann report, differential blood count, and sensitization tests when indicated. (3) Proper bacteriologic investigation. (4) Whatever x-ray studies the case suggests, chiefly head and thorax.

Perhaps the best way to approach the problem without going into minute detail is to cite a few specific examples that have recently come under our observation. First let us list the conditions most commonly simulating sinus diseases and then briefly discuss them.

(1) Neurasthenia
(2) Allergic conditions
(3) Infected teeth
(4) Refractive errors and eyestrain (we shall not enlarge on this field)
(5) Syphilis
(6) Intracranial conditions
(7) Disturbances of the endocrine glands
(8) Improper diet
(9) Undulant fever
(10) Encephalitis

(1) *Neurasthenia.*—How many times have we all seen the young woman complaining of headache all over the head, but especially in the occipital region and radiating down the neck and shoulders, giving a positive answer to almost every question and offering most distressing tangential suggestions, always making the insinuation or direct statement of her own diagnosis of "sinus trouble!" The married woman with domestic difficulties that defeat her or the fortyish spinster with not enough occupation. This group must be very carefully handled always, of course, under the supervision of a wise internist who may direct some temporary local treatment or even possibly a minor operation. Under no circumstances should the specialist assume the responsibility of telling the patient there is nothing wrong with her sinuses; or that she has a nasal obstruction that must be corrected by a slight operation and so on. In no other situation is a conscientious, painstaking examination (always using the nasopharyngoscope and x-ray) more important.

(2) *Allergic Conditions.*—A two and a half year old girl is brought in complaining of constant colds, stuffy nose, sniffles. A small amount of adenoid tissue is removed with temporary improvement (because of a change in environment). Finally the mother is prevailed upon to have sensitization tests made and the child is highly susceptible to orris root.

For two months a draftsman in an architect's office has been unable to work before 1:00 o'clock because of itchy, watery eyes, sneezing, completely stopped-up nose and headache. Careful questioning as to time and manner of onset elicits the fact that the "sinus trouble" (that was his original complaint) began coincidentally with a change in shaving technic. Upon discarding the generously donated cream and returning to the old familiar soap his symptoms immediately disappeared.

A 13-year-old girl, after three years of treatment, irrigations, sprays, local applications, cauterizations and intranasal operation, was faced with a radical antrum operation. The mother sought another opinion. There was no pus nor polypi to be found, but the typical boggy, greyish mucous membrane of both nostrils. For some reason the mother refused to have sensitization tests, but cooperated by changing the environment, first to the seashore, then to the mountains, where in both instances all the sinus trouble cleared up. In analyzing the situation with the mother it was discovered that the girl was very fond of cats and had at least fifteen at home, four to six sleeping on her bed every night.

It required two years to discover that a 60-year-old woman had become sensitive to wheat, although the skin tests did not reveal it. She was seen at intervals of six weeks simply to keep her from being cauterized or operated upon.

Examples of susceptibility could be recited indefinitely, from goats to guineas, and cosmetics to cows, but you will agree that in this field can be found the greatest martyrs to unnecessary and futile surgical interference.

(3) *Infected Teeth.*—Probably no other factor in the sinus picture is so commonly overlooked as teeth, and until the offending member is discovered and extracted all measures are doomed to failure. Here we are dealing with a true sinus condition that is not primary.

A despondent intern produced an x-ray film showing a very cloudy right antrum and said: "When will you do a radical on me? I don't want to have asthma." He had been singularly free of colds up to the previous six months and the symptoms experienced were not commensurate with the degree of involvement indicated

by the x-ray. Examination of the nasal passages revealed no pathologic condition other than a rather profuse mucous discharge in the right middle meatus. X-ray of the upper right teeth disclosed a small pocket about the first bicuspid. The tooth was removed and in three weeks without any local treatment another x-ray showed a perfectly clear antrum.

One must always be on the lookout for dentigerous cysts, as this condition is quite frequently missed.

(4) Refractive errors and eye strain are not to be discussed.

(5) *Syphilis.*—So frequently headache is one of the principle symptoms of this widespread disease that it causes the victim to seek relief from the "head specialist." A comprehensive consideration of this problem is entirely beyond the scope of this paper. However, a few high points can be mentioned.

When there is the remotest possibility of specific infection a sinus operation should never be done until a Wassermann test has been made.

A 48-year-old steel worker was sent for an emergency frontal sinus operation. His temperature was 103°, he had a violent headache, profuse nasal discharge, extreme tenderness over sinuses, and profound prostration. He denied any history of venereal infection, but said he had a fall twelve years previously which resulted in head injury that took eight months to heal and left a very irregular bony scar in the midparietal region. The Wassermann reaction was 100 per cent positive and instead of getting an operation (which would have resulted in a terrible mess) he obtained rapid relief by palliative means and antisyphilitic treatment.

(6) *Intracranial Conditions.*—Brain tumor, brain abscess, vascular conditions must always be considered.

A 23-year-old man came in for relief of very severe headaches; he had been treated for frontal sinus trouble every day for six weeks. Examination showed no clinical evidence of sinus disease, but extreme papilledema. On careful questioning he remembered having a boil in the middle of his forehead about two weeks before his symptoms appeared. He was referred to a brain specialist, who opened a large brain abscess in the midfrontal region. The patient improved, but drainage was difficult. After fifteen months of ups and downs he finally died. Autopsy showed no involvement of any of the sinuses. Undoubtedly he had a direct extension of the staphylococcus infection through the lymph channels or blood vessels.

(7) *Disturbances of Endocrine Glands.*—It is always necessary to bear in mind this very wide field. A basal metabolism test is most helpful. A 35-year-old woman developed incapacitating headaches; when first seen she had an acute right antrum (incident to a cold) which cleared up in two weeks. The headaches became worse. A thyroid deficiency was discovered and the symptoms immediately disappeared on administration of thyroid extract. Another woman was relieved of "hay fever" and "sinus trouble" of three years' duration by an ovarian operation. A woman of 50 developed headache, bloody mucous discharge from both nostrils, cough and low grade fever. The medical man insisted it must be a sinus infection, but there was no convincing evidence either clinically or by x-ray. The gynecologist found a cervicitis and endometritis and hysterectomy afforded a prompt cure of all symptoms.

(8) *Improper Diet.*—We have seen several débutantes who, wishing to remain slender, did not eat sufficient or proper food and promptly developed a mucous discharge in the nasopharynx, hacking cough and some headaches. Instead of chest x-rays and sinus treatment proper rest and correct diet restored them to normal. This fact is of greatest importance in dealing with children.

(9) *Undulant Fever.*—This condition may be easily confused with an acute sinus infection because the symptoms are alike: severe headache, fever, nasal discharge, photophobia, drowsiness. The agglutination test is a vital diagnostic point. In our last case, a surgeon with a history of previous sinus trouble, the medical diagnosis was influenza with acute exacerbation of sinusitus. The clinical findings in the nasal cavities and sinuses did not bear out this assumption, and though a negative agglutination was reported, we insisted on another test in a different laboratory. When this came back strongly positive for melitensis infection, a check-up in the first laboratory disclosed an error in the titration technic.

(10) *Encephalitis.*—Very frequently the rhinologist is called in consultation before the diagnosis in this disease is definitely established. Time does not permit of further discussion of this matter, but we shall briefly summarize by saying that in all acute cases it is extremely important to make haste slowly and utilize every possible diagnostic procedure. In the chronic cases, before resorting to radical measures, be certain that we have eliminated the above mentioned conditions. This presentation does not presume to have exhausted the entire gamut of diseases simulating sinus involvement, but we hope it may prove of suggestive value.

BLOOD FINDINGS AND RENAL FUNCTION TEST IN KIDNEY TRAUMA: AN EXPERIMENTAL STUDY*

By W. CALHOUN STIRLING, M.D., F.A.C.S.†
and
A. M. LANDS, B.A., M.A., PH.D.‡
Washington, District of Columbia

Urological surgery has made very rapid strides in the past two decades. There remain, however, certain problems to be solved. Such conditions, to list a few, are calculosis, renal infection and trauma, neoplasia, and prostatic diseases, all of which are still grounds for experimental and clinical study.

The gradual attainment of industrial mechanization has greatly contributed to the toll of renal injuries; particularly is this true of those resulting from automobile accidents. The advent of industrial group insurance and other compensation boards has focused attention on the problem of kidney trauma and demands from us, as surgeons, some degree of unanimity of opinion as to the degree and type of disability incurred and the need for convalescent care in such injuries.

The frequency of kidney trauma has presented certain new problems to the urologist not formerly appreciated. Even now, compared to the total number of cases of kidney disease seen by the urologist, kidney trauma is relatively rare. For that reason it occurred to us that an experimental study of kidney trauma might clear up some disputed points related to this condition.

In a previous paper,[1 2] based upon an experimental study of kidney injury in cats and dogs, we reclassified kidney trauma and found that it could be divided into four groups. Group I embraced minor injuries of the kidney occurring principally in the perirenal fascia, which were characterized by petechial hemorrhagic areas about the torn vessels with little or no injury to the fibrous capsule or renal parenchyma. The second group included more severe injuries of the kidney with rupture of the fibrous capsule and minor lacerations of the kidney cortex. The third and most important group, from a clinical standpoint, included those injuries in which the renal parenchyma was grossly damaged, varying from moderate to extensive laceration with or without involvement of the renal pelvis. The most striking finding in this study was that the resistance offered by the kidney to laceration was attributable largely to the protection offered by its perirenal fascia and more especially the fibrous capsule. The amount of force necessary to rupture the kidney is essentially that which will produce a primary divulsion of the capsule. The majority of cases requiring surgical intervention fall into this and the fourth group, in which pulpification, and often tearing of the renal vessels occurred.

Types I and II injuries rarely come to the attention of the urologist, as these injuries exhibit few, if any, local evidences of kidney damage such as hematuria, pain or localized mass, and usually make an untoward recovery without evident dysfunction.

In Type III injuries, rupture of the capsule and extensive parenchymal laceration is a consistent finding. There is considerable hemorrhage into the perinephric fossa and hematuria which may continue for an indefinite period of time unless some attempt is made to repair the damaged organ. We do not believe that early radical surgery is indicated routinely, but it has been our experience that untreated traumatized kidneys may develop complications which later make some form of surgical intervention the procedure of choice.

Prior to the advent of intravenous urography normal restoration of kidney function was assumed when the acute symptoms had subsided, whereas the more general use of intravenous pyelography has shown that this is not always the case. This modality is a valuable means of determining the amount of damage produced, and also enables the surgeon later to check on the degree of functional restoration of the organ during convalescence. It has been found by us clinically, as well as experimentally, that conservative treatment of Type III injuries often leads to marked loss of function in the injured organ and that occasionally one sees the advent of such complications as hydronephrosis, perirenal suppuration, cystic formation, calculosis, secondary bleeding, and fibrosis which may later result in atrophy of the organ either from a disturbance of the blood supply or impairment

*Read in Section on Urology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

†Associate Professor of Genito-Urinary Surgery, Georgetown University School of Medicine.

‡Instructor in Physiology, Georgetown University School of Medicine.

of the emptying of the renal pelvis from scar formation.

Wood, Lowsley, LeComte[3 4 5] and others in recent publications have confirmed in their essentials these observations.

In Group IV, in which there is pulpification or separation of one or more poles of the kidney with or without laceration of the renal vessels, nephrectomy is usually the procedure of choice. Fortunately the majority of kidney injuries fall into Groups I and II, as about two-thirds of all renal injuries respond well to conservative treatment. As clinicians and surgeons we are interested chiefly in Type III injuries which, according to our experimental data, as well as clinical observations, are best handled by conservative renal surgery. By using one of the urographic modalities combined with the clinical and laboratory findings, the exact pathological picture and anatomical integrity of each organ can usually be determined and indicates to the physician the type of treatment needed. In the presence of severe injury with urographic evidence of pelvic rupture, continued bleeding, shock, lowering of the blood pressure and red cell count, conservative repair and drainage will save many patients from losing a potentially good kidney. The patient should receive supportive measures, transfusion as indicated, infusions of glucose or saline, heat and sedation, and should be allowed time to react. If, however, there is evidence of continued hemorrhage and shock, time should not be lost in delaying such operative measures as are needed in that particular case, such as the arrest of bleeding by packing and suture, debridement and drainage or occasionally nephrectomy. The proponents of non-surgical treatment should realize that surgical intervention does not imply nephrectomy necessarily, but enables the surgeon to arrest bleeding, repair, drain, and conserve the traumatized kidney.

Degenerative Changes Following Renal Trauma.—We wish briefly to call attention to the frequency of renal degeneration following extensive trauma, evidenced by partial or incomplete necrosis of the renal cortex. This probably is due to its singular blood supply as detached portions of the renal cortex rapidly undergo necrosis and may produce toxemia. (This point will be shown in the slides.) These findings indicate the value of debridement and drainage in such injuries, thereby lessening the possibility of toxic absorption following injury to the renal cortex.

We should like to add that it has been our experience, in agreement with the findings of Lowsley and others, that fat has proven an excellent hemostatic agent. Ribbon gut sutures were found very helpful in this type of injury and were definitely superior to the older method of direct suture of the organ using round catgut. We found no evidence of delayed healing from non-absorption of the ribbon gut and very little, if any, shrinkage of the organ. It is of interest to note that ribbon gut contains one-third less material than the standard round gut.

Anemia as a Complicating Factor in Kidney Trauma.—Since hematuria is a common observation in the more serious types of kidney trauma, we thought it well to follow the blood picture in our experimental studies. It soon became obvious that there was either a failure to replace the blood lost by hemorrhage or a further reduction in the number of circulating erythrocytes, which findings could not be attributed to hemorrhage. This reduction in the red cell count did not usually become apparent until after the first four or five postoperative days, as shown by these protocols:

In a cat with a normal erythrocyte count of 7,100,000 there was no significant change in the red cell count until after the fifth postoperative day. After this time the red cell count gradually dropped until it reached the low value of 5,200,000 on the thirteenth postoperative day. Control animals in the same series in which the kidneys were exposed but not traumatized showed no alteration in the red cell count at any time. The white cell count in both groups showed considerable variation and in a general way showed an inverse ratio to the red cell count, but was not otherwise significant.

In another animal where the normal red cell count was 8,000,000 it dropped to 6,750,000 the first postoperative day and was only 5,150,000 on the eleventh postoperative day when the animal was sacrificed. The kidney findings were similar to those noted in the preceding instance.

These findings are typical of our whole series. The reduction in red cells not typically related to active bleeding suggests the possibility that there is a toxic destruction of erythrocytes and depressed hematopoiesis following the trauma.

In an attempt to determine the cause of the anemia a further experimental study was undertaken. The usual kidney trauma was produced in two dogs and in a third, muscle trauma in the kidney area alone was produced. Red cell and reticulocyte counts were made in the usual manner (see *Table 1*). During the first four or five days following the experiments there were no significant alterations in the number of red cells, but there was a marked reticulocytosis

Table 1

COMPARISON OF BLOOD COUNTS IN RENAL AND MUSCLE TRAUMA

Date	Dog 1		Dog 2		Dog 3		Dog 4	
	Red Cell*	Reticulocyte	Red Cell	Reticulocyte	Red Cell	Reticulocyte	Red Cell	Reticulocyte
10/24	7.95	†	6.15		7.15		6.20	
10/27	8.50		4.65		5.15		7.00	
10/29	7.30		5.15		6.65		6.00	
	Muscle Trauma							
10/30	6.50	2.15	5.05	1.0	6.95	2.25	5.00	
10/31	6.00	2.00	4.15	1.21	7.80	0.96	4.80	
11/ 1	6.80	0.88	4.24	1.00	5.24	1.22	4.50	
11/ 2	8.40	1.00	3.75		6.15		3.90	
11/ 4	6.50		4.50		5.15		3.10	
11/ 6	6.12		4.20		4.90		4.00	
11/ 9	6.50	normal	4.65	2.2	5.80	0.4	5.25	
11/13	7.00	normal						

*In millions per cu. mm.

†Per cent reticulocytes (Normal less than 0.1 per cent.)

rising from less than 0.1 per cent to as high as 2 per cent, which was still markedly above normal after fourteen days. After this preliminary period of four or five days there was a gradual reduction in the number of red cells. This reduction was associated with a high reticulocyte count. As the count was high and remained above normal throughout the experimental period of fourteen days, we are not prepared to say whether there was a second reticulocytosis. There was no evidence of depressed hematopoiesis. In a dog subjected to muscle trauma alone there was a similar reticulocytosis during the first three days, but little or no change in the number of red cells was noted at any time.

A study of some recent case histories of kidney trauma has shown an inadequate follow-up of the blood picture. We should like to emphasize the value of frequent red blood counts in cases of suspected renal injury and particularly so in light of the fact that anemia may result from degenerative kidney changes. This is well borne out by a recent case history brought to our attention by Randall.[6]

A male adult was injured November 2, 1935, and was brought to the hospital complaining of severe pain in the side and blood in the urine. This hematuria continued for two weeks, when he received a blood transfusion of 250 c. c. of blood. His hemoglobin at this time was 45 per cent, red cells 2,800,000. The hematuria continued until November 19, when a blood count showed 67 per cent hemoglobin and 4,000,000 erythrocytes. By November 22 the bleeding had stopped and the hemoglobin was 54 per cent, and twelve days later was 58 per cent. A week later the reading was only 61 per cent, at which time he received a second transfusion of 375 c. c. of blood. However, on December 16, six weeks after the injury, the hemoglobin was only 67 per cent, with only 3,200,000 red cells.

We believe this marked secondary anemia and the experimental findings suggest the liberation by the injured kidney tissue of some substance capable of causing the toxic destruction of red cells and probably a depressed hematopoiesis. We should add that secondary anemia is rare following abdominal operations. Walton,[7] in a study of 794 cases of partial gastrectomy or local resection, reported only six instances of secondary anemia. It is likely that further light on the nature of erythrocyte reduction can be obtained by the intraperitoneal implantation of tissue or the intraperitoneal injection of extracts of fresh and injured kidneys. We are now working on this problem.

Numerous recent papers have called attention to a secondary anemia associated with degenerative changes of the kidney, particularly those in chronic nephritis. Brown and Roth[8] reported anemia in 187 cases of chronic nephritis and said the anemia was directly proportional to the increase in the blood creatinine. Ashe found "secondary anemia invariably associated with and directly proportional to the degree of impairment of renal function," and says this relationship holds true for renal insufficiency from any cause, that is, from nephritis, polycystic kidney or nephrectomy. He further states the blood count is of value in estimating the relative importance of the kidney. Brown, Euster-

man, Hartman and Rowntree[9] report decreased renal function and degenerative kidney lesions in some cases of duodenal toxemia. A study of their protocols reveals the occurrence of anemia. Adams and Brown[10] have reported that 90 per cent of a series of 79 cases of hypertension with arteriosclerosis and renal insufficiency show a reduction in hemoglobin and erythrocytes. In hypertension with adequate renal function the hemoglobin and red cell counts were found normal, and they conclude that anemia was related to renal insufficiency.

These findings suggest the possibility that degenerative changes in the kidney release some toxic agent capable of influencing adversely the blood picture.

CONCLUSIONS

(1) Among the clinical complications seen following renal trauma are cystic degeneration, perirenal suppuration, stone formation, atrophy, delayed bleeding, hydro and pyonephrosis, ptosis and fibrosis, resulting in ultimate dysfunction of the organ.

(2) On the basis of an experimental study the degree of kidney trauma has been classified. Types I and II injuries may be treated expectantly, whereas injuries listed as Type III probably will require surgical treatment. In Type IV injuries nephrectomy is usually required.

(3) A study of the blood picture following experimental trauma suggests the possibility that a persistent anemia not related to hemorrhage may occur. Reticulocyte counts suggest that this anemia is due to toxemia, although the possibility of simultaneous depression of hemapoiesis is not ruled out.*

BIBLIOGRAPHY

1. Stirling, W. C.: Traumatism of the Kidney: Report of Twenty-Seven Cases. An Experimental and Clinical Study. Brit. Jour. Urol., **8**:1-21, 1936.
2. Stirling, W. C.: Subparietal Traumatism of the Kidney: Report of Four Cases. International Clinics, **3**:169-174, 1925.
3. Wood, A. H.: Management of Trauma to the Kidney. Surg. Clinics of N. Amer., **16**:1231-1238, 1936.
4. Lowsley, O. S.: Some New Developments in Renal Surgery. Sou. Med. Jour., **27**:139-147, 1934.
   Advances in Renal Surgery with Particular Reference to Nephropexy. Jour. Mo. State Med. Assn., pp. 313-316 (Aug.) 1935.
5. LeComte, R. M.: Subcutaneous Kidney Ruptures: Report of Two Cases. Spontaneous Rupture of Hemorrhagic Cyst. Traumatic Rupture of Lone Kidney. Urol. & Cutan. Rev., **39**:13-16, 1935.
6. Randall, A. R.: Personal Communication, 1936.
7. Walton, A. J.: Failures of Gastric Surgery. Lancet, **1**: 897, 1934.
8. Brown, G. E.; and Roth, G. M.: Prognostic Value of Anemia in Chronic Glomerular Nephritis. Collected Papers of the Mayo Clinic, **15**:691-697, 1923.
9. Brown, G. E.: Eusterman, G. B.; Hartman, H. R.; and Rowntree, L. G.: Toxic Nephritis in Pyloric and Duodenal Obstruction: Renal Insufficiency Complicating Gastric Tetany. Collected Papers of the Mayo Clinic, **15**:360-377, 1923.
10. Adams, S. F.; and Brown, G. E.: The Blood in Cases of Hypertension: The Relationship Between Anemia and Renal Insufficiency. Collected Papers of the Mayo Clinic, **17**: 607-612, 1925.

*We wish to express our gratitude to Dr. Reginald A. Cutting, Professor of Physiology, Georgetown University School of Medicine, for his encouragement and many helpful suggestions during the progress of this study.

We also wish to express our appreciation to Mr. Vines Collier for his assistance in the carrying out of this study.

DISCUSSION (*Abstract*)

Dr. Marcus G. Spingarn, Memphis, Tenn.—Cases of kidney trauma cannot be classed as rare, yet no one man receives very many such injuries for treatment during his lifetime. In our town of two hundred and fifty thousand inhabitants, a town which is also a tourist center due to excellent highways, the following figures taken from the records of our two largest hospitals are interesting and denote the scarcity of such injuries. The John Gaston Hospital, our charity institution, records for 1936 with admittances as new to date, 15,000 approximately, one kidney trauma case and that was a gun shot wound. From January, 1931, to January, 1936, with new admittances during these five years 63,000, 8 kidney trauma cases, 3 gun shot wounds and one stab wound are recorded.

The records from the Baptist Memorial Hospital with a record of 91,566 cases treated during the period from 1930 to 1936 inclusive, show 7 kidney trauma cases, 1 gun shot wound and one spontaneous rupture.

This gives us a total of 15 traumatic injuries, 5 gun shot wounds, one spontaneous rupture for the six-year period. Of the fifteen traumatic cases one received intravenous pyelography, 4 received retrograde pyelography, 5 cases received plain kidney-ureter-bladder pictures as an aid in diagnosis. With this scarcity of material, conclusions as to the best method of treatment cannot be drawn.

Dr. Stirling has given us a working basis for studying these injuries. The classification into four types, theoretical, is yet very practical. Conservatism is the key note to treatment and I cannot subscribe to the idea that all cases showing rupture into the parenchyma and pelvis should receive surgical repair. Continual alarming hemorrhage would guide me there. Although the resumption of total physiological function does not necessarily follow, it is not proven beyond a doubt that total function will follow surgical repair or that stone formation is prevented or that there is less disturbance of blood supply. Nevertheless Dr. Stirling has given us something to think about in his contribution to this work.

Dr. R. M. LeComte, Washington, D. C.—I am not capable of discussing the reticulocyte count but as far as I can judge from Dr. Stirling's study, it is merely another indication in favor of early rather than late operation, before necrosis of the separated renal fragments has occurred and absorption is well advanced.

Every case of injury in which the kidney bleeds more than a little bit is the subject of earnest consideration

as regards operation. It does not matter whether the amount of blood and the state of the kidney is determined by the clinical findings of lumbar mass or shock or by x-ray studies and urography. If more than a moderate amount of blood is shed into the kidney fossa or the kidney pelvis it subjects the kidney itself to the hazard of immediate or remote urinary obstruction and infection and consequently the blood clot should be removed as soon as possible by surgical means if necessary. Apart from the benefit to be gained in checking hemorrhage with certainty, there is the advantage of possibly preventing secondary effects that may require nephrectomy later. This latter point should be stressed with the referring physician, many of whom seem to feel that an exploratory operation necessarily means nephrectomy. It does not, for if the operation is done promptly it often means saving the kidney as well as the life of the patient. In rupture the condition of the kidney can be much better judged and cared for at operation than by any other means.

Dr. Stirling (closing).—I want to take this opportunity of expressing to my collaborator, Dr. Lands, my sincere thanks for his cooperation and original observations in regard to anemia in kidney injuries. The observation that anemia, other than that resulting from hemorrhage, is a complicating factor following renal trauma, was original with him. A later study of the literature suggests this is not uncommon where there is degeneration of the renal tissue.

Two questions were asked by members of the Section, the first of which was, did we find any delay in healing following the use of band sutures? We found no evidence of delayed healing from band sutures in our experimental work.

In answer to the second question, how did we differentiate clinically between Types II and III injuries, that is, between the borderline cases: clinically we found certain rather clear-cut and definite indications for surgery. These include continued high and increasing pulse rate, lowering of the blood pressure, decrease in the number of circulating erythrocytes, shock, and other evidences of continued bleeding. A mass in the loin with extravasation of opaque fluid from the renal pelvis, evidenced by intravenous urograms, or the onset of urosepsis, requires early drainage. In the absence of the above indications for surgery, we advise rest and suppurative measures.

Formerly, in cases of renal injury, when in doubt expectant treatment was instituted, but the more universal application of intravenous urography has shown that, although the symptoms may subside clinically, restoration of function does not necessarily occur. This point is well brought out by the number of cases recently reported in which total loss of function occurred due to destruction of the blood supply, or alteration of the anatomic integrity of the renal pelvis, later resulting in hydronephrosis, cystic formation or stone. Unquestionably many severely injured kidneys can be restored to fairly normal function if drainage is instituted early, a debridement done, and the intracapsular tension relieved. Only the hopelessly injured organs require nephrectomy, as it has been shown by repeated experimental observations that, even in the presence of severe trauma, provided the blood supply is intact, restoration of function may occur.

During convalescence frequent intravenous urographic check-ups should be made to determine this point.

OBSERVATIONS ON RECENT INVESTIGATIONS OF THE MALE SEX HORMONES*

By MAXIMILIAN EHRENSTEIN, PH.D.†
University, Virginia

It must be stated at the outset that recent advances in the field of the male sex hormones are so manifold, especially on the chemical and physiological side of the problem, that this paper can encompass only a discussion of the more striking, pertinent facts of the subject.

It is known that the maturation and whole function of the sex glands are regulated by the gonadotropic factor of the anterior pituitary. This factor is non-specific so far as sex is concerned: that is to say, the sex glands of either male or female individuals respond to the influence of the same gonadotropic substance. Within the mature sex glands, formation of the specific sex hormones takes place. On the latter depend the secondary sex organs and the secondary sex characteristics.

In females we must differentiate two groups of hormones: (1) the different estrogenic substances, and (2) the progestational hormone or corpus luteum hormone. We know that regular menstrual cycles, for instance, depend on the action of these two groups of substances. Since the crystallization and the subsequent synthesis of these chemical compounds were carried out several years ago, commercial preparations of these substances have been on the market for some time. Hence, much experience in the clinical field has been obtained, and the practicing physician is fairly well informed concerning their value. Unfortunately the picture is different in the field of the male sex hormones. Striking chemical results were not obtained until recently, and pure commercial preparations have thus been available in this country for about three months only.

Two physiological methods for assaying the male sex hormones are widely used. One is the well-known comb growth test which originated with Pézard[1] and which was placed on a firm quantitative basis by Gallagher and Koch.[2] In

*Read in Section on Urology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Physiological Laboratory, University of Virginia Medical School, Charlottesville, Virginia.

†Research Associate in Organic and Physiological Chemistry. Supported by the Division of Natural Sciences of the Rockefeller Foundation.

capons (Leghorns), degeneration of the comb is uniformly observed; administration of the male sex hormones, however, brings about a restoration of growth to normal. One capon unit[3] is defined as the amount of substance which, when injected once a day on two successive days, produces by the fourth or fifth day (3 animals) an average increase of 20 per cent in the area of the comb. The substance may also be administered by spreading a solution of the hormone in oil on the comb[4] itself, in which case the effect is even more intense than if the hormone is injected subcutaneously or given by mouth. It should be mentioned that the comb growth effect is not sex-specific, since it can also be brought about in hens.

The male sex hormones exert a characteristic growth effect on the male accessory sex organs, such as the vas deferens, seminal vesicles, prostate gland, Cowper's glands and penis. Stimulation of development of the infantile seminal vesicles in young rats towards the adult type can be used to determine the potency of male hormones. Likewise castrated adults may be used as test animals. Steinach[5] had already observed in 1894 that in such castrated animals the seminal vesicles undergo atrophy. The histologic changes were investigated much later, especially by Loewe[6] and Voss. Administration of adequate doses of male sex hormones will restore the atrophied seminal vesicles to normal moreover, the vesicles will again start to secrete. One "seminal vesicle unit" may be defined as the dose which must be injected into infantile male rats once daily for eight successive days in order to transform the undeveloped epithelium of the infantile seminal vesicles into that of mature animals. Microscopic examination is necessary to reveal the effect.[7]

Chemical investigations of the specific sex hormones have shown that a certain functional effect is not invariably produced by only one chemical substance. Apparently nature often employs several chemically closely related substances for the performance of a certain physiologic task. Thus several estrus-producing substances occur in nature, and to date five chemically different male hormones have been isolated from natural material. All these compounds produce either growth of the comb in capons or development of the seminal vesicles in infantile or castrated adult rats. There exists no constant ratio between the capon units and the seminal vesicle units in the different male hormones. One may be relatively more effective as far as the influence on the secondary sex characteristics, such as the comb growth, is concerned; the other may exert a relatively larger effect on the genital organs, such as the seminal vesicles.

A number of outstanding scientists, especially the German Adolf Butenandt and the Swiss Leopold Ruzicka, attacked the problem of analyzing and synthesizing the male sex hormones. Even though an extract obtained from testes appeared to be the best starting material, the first substance of this class, androsterone, was isolated from another natural source, namely: the urine of males.[3] Later a second compound was isolated from urine, dehydro-iso-androsterone.[8] Previously the opinion prevailed that these substances likewise occurred in testes. The fact that the physiologic activity of the testis hormone is destroyed by alkali, however, and that of the hormones obtained from urine is not, indicates that the testis hormone is chemically different. This observation was made by Koch and Gallagher[9] and was later investigated by the Dutch pharmacologist Laqueur,[10] who succeeded about one year ago in isolating "testosterone" in a pure crystalline form from bull testes. Testosterone is the most effective male hormone thus far isolated from natural material: one capon unit and one seminal vesicle unit are contained in the least amount of weight (see *Table 1*).

Regarding the effects of the male hormones, it should be noted that there exists no constant ratio between comb growth and seminal vesicle effects, as follows from the last column of *Table 1*. There are also differences as far as the action on other male secondary sex organs is concerned, such as that produced on the prostate gland. Among others, Tschopp[11] carried out quantitative studies in this direction, for example he examined the development of the weight ratio between seminal vesicles and prostate gland in normal growing animals. Moreover, castrated rats were observed under the influence of different male hormones. From these experiments the conclusion may be drawn that, under certain experimental conditions, a normal ratio can be obtained in castrated animals. When rather high doses were given, however, androsterone acted more on the growth of the prostate gland, while testosterone (and other unsaturated, synthetic compounds) was apparently more effective on the seminal vesicles.

Besides the three male hormones thus far discussed, one should mention two further sub-

Table 1*

Name of the Hormone	Isolated		Synthesized by	Weight of Hormone Containing 1 Capon Unit	How Many Times More Effective than Androsterone	Dosage in Seminal Vesicle Test	How Many Times More Effective than Androsterone	1 Seminal Vesicle Unit in Terms of Capon Units
	From	By						
Androsterone	Urine of men	Butenandt, 1931	Ruzicka, 1934 (from cholesterol)	200 gamma	1.0	1.0 mg	1.0	5:1
Dehydro-iso-androsterone	Urine of men	Butenandt, 1934	Butenandt, 1935 Ruzicka, 1935 (from cholesterol)	600 gamma	0.33	3.0 mg.	0.33	5:1
Testosterone	Bull testes	Laqueur, 1935	Butenandt, 1935 Ruzicka, 1935 (from cholesterol)	30 gamma	6.67	0.1 mg.	10.0	3:1
Androstanedion	Boar testes ?	Ogata and Hirano, 1934	Ruzicka, 1935	250 gamma	0.8	0.7 mg.	1.4	2.8:1
Adrenosterone	Cattle adrenal glands	Reichstein. 1936	Not yet	1000 gamma	0.2	not yet examined.		

*Data taken in part from Kurt Tscherning, Ueber die Chemie und Physiologie der Androsterongruppe, Angewandte Chemie, **49**:13-15, 1936.

International units referring to certain amounts of weight of chemically pure sex hormones were established by the Health Organization of the League of Nations. 0.1 milligram of androsterone is 1 International Unit.

(League of Nations. Quarterly Bulletin of the Health Organization, **4**:618, 1935.)

stances. One was isolated by the Japanese scientists, Ogata and Hirano,[12] from boar testes (2 mg. of pure substance from 80 kg. of boar testes!). It is not destroyed by alkali. Ruzicka[13] is of the opinion that this hormone might be identical with the synthetically obtainable androstanedione. The other substance was recently obtained by the Swiss chemist Reichstein[14] from the adrenal glands. It was given the name adrenosterone: 26 mgs. of impure crystals were obtained from 1,000 kilos of beef adrenals. The comb growth effect of this substance is only about one-fifth that of androsterone. Its influence on the seminal vesicles has not yet been examined. Even though the physiologic activity seems to be only slight, it is interesting to note the presence of a male sex hormone in the adrenal glands. In additon, Reichstein isolated a few physiologically inactive substances which, by oxidation, could be transformed into compounds with male sex hormone properties. This fact is especially interesting if one considers certain suprarenal tumors which cause virilism in females. Reichstein[15] recently stated that he likewise obtained evidence for the presence of estrogenic hormones in the adrenal glands.

With regard to the chemistry of the male sex hormones it should be remarked that the male hormones are intimately related to the female sex hormones. Among the latter we differentiate the various estrogenic hormones and the corpus luteum hormone. Thus far the chemical constitution of four naturally occurring estrogenic substances has been determined, namely: that of estrone, which is also called alpha-follicular hormone, estriol, estradiol and equilenin. Estradiol is the most effective substance of this group; it is the only estrogenic compound which could not only be obtained from pregnancy urine,[16] but also from ovarian follicles.[17] As far as we know, only one modification of the corpus luteum hormone occurs in nature.

All sex hormones are probably derived from cholesterol, which must be regarded as the mother substance. The bile acid types may be formed by oxidation of the sterols, whereby the side chain of the sterol molecule is shortened. If shortening is carried still farther, the corpus luteum hormone is obtained. This is a di-ketone, and its chemical name is now given as progesterone. By another oxidation, one may split off the entire side chain to yield the dehydro-iso-androsterone. This substance has the properties both of ketone and of secondary alcohol. It differs from androsterone in two respects: it contains two hydrogen atoms less (thus there exists a double bond), and also the

spatial arrangement on one carbon atom (X) is different.

Dehydro - iso - androsterone may be transformed either into the other male sex hormones, androstanedione, androsterone, testosterone or possibly adrenosterone, or into one of the four estrogenic hormones. According to the investigations of Butenandt[18] and others, it is very probable that the so-called androstenedione is an important intermediary product. This substance has not yet been obtained from natural material; Butenandt prepared it artificially and

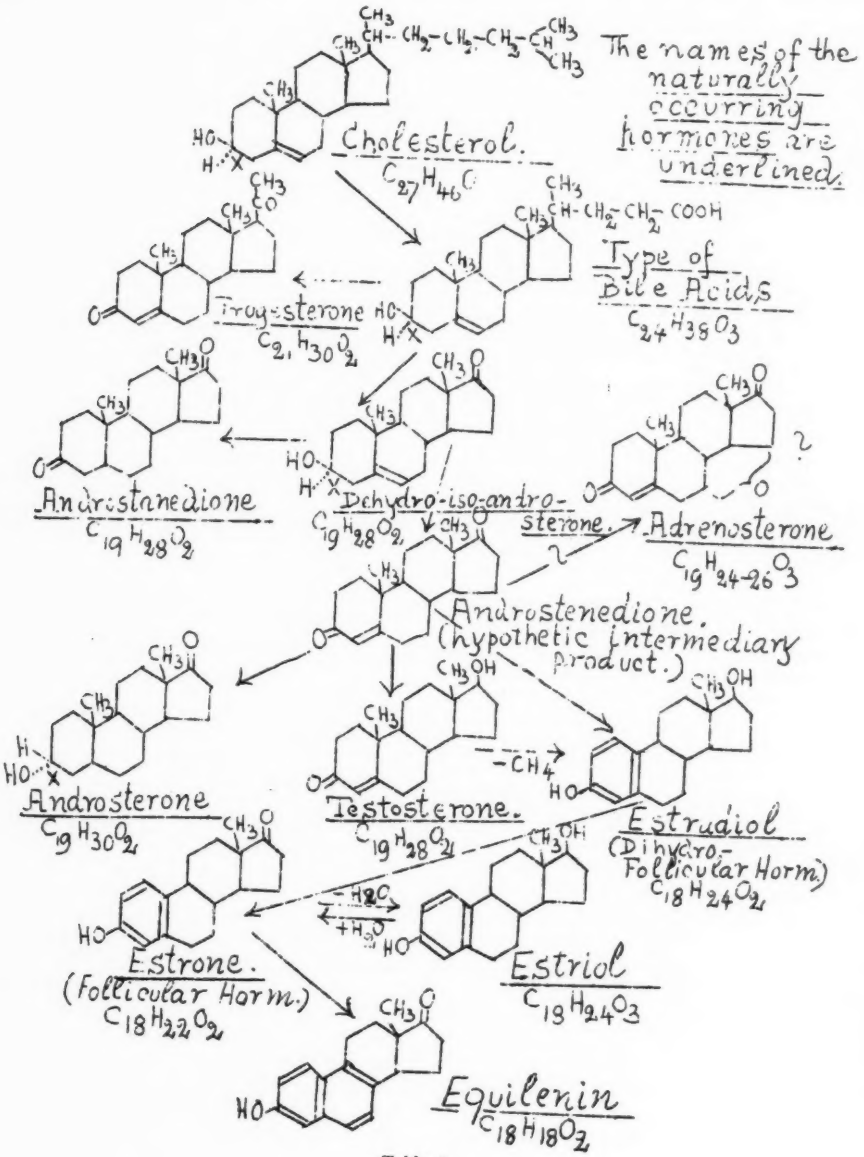


Table 2

obtained the very interesting result that it shows either estrogenic properties or the properties of a male sex hormone. One is justified, therefore, in making the assumption that this substance is transformed in the body into either an estrogenic hormone or a male sex hormone.

It is to be observed that the naturally occurring estrogenic hormones contain at least three double bonds and thus contain a benzene ring structure within the molecule. Such substances can be formed from androstenedione by means of a simple dehydrogenation and splitting off of CH_4. It is easily possible that such chemical reactions are performed in the body tissues. The occurrence of estrogenic substances in male urine as well as in testes[19] is very interesting in this connection, for Steinach[20] found that the administration of chemically pure male sex hormones causes an increased output of estrogenic substances in the urine. This may likewise be interpreted in favor of the view that the estrogenic hormones originate from male sex hormones.

Fortunately four male hormones, namely: androsterone, dehydro-iso-androsterone, testosterone and androstanedione, have been synthesized. The same can be stated concerning the corpus luteum hormone,[21] and estrone,[22] and estradiol.[23] It is really not exact to use in these cases the term "synthesis," since only a chemical transformation or degradation of certain sterols has been carried out. One may better use the term "pseudo-synthesis."[24] In the case of the male sex hormones, the easily obtainable cholesterol is used as starting material. The pseudo-synthesis of the most important male hormone "testosterone" may give one an idea how such transformations are carried out in the laboratory[25] (see *Table 3*).

The alcohol group of cholesterol is esterified with acetic acid and thus protected against chemical attacks. Bromine is added to the

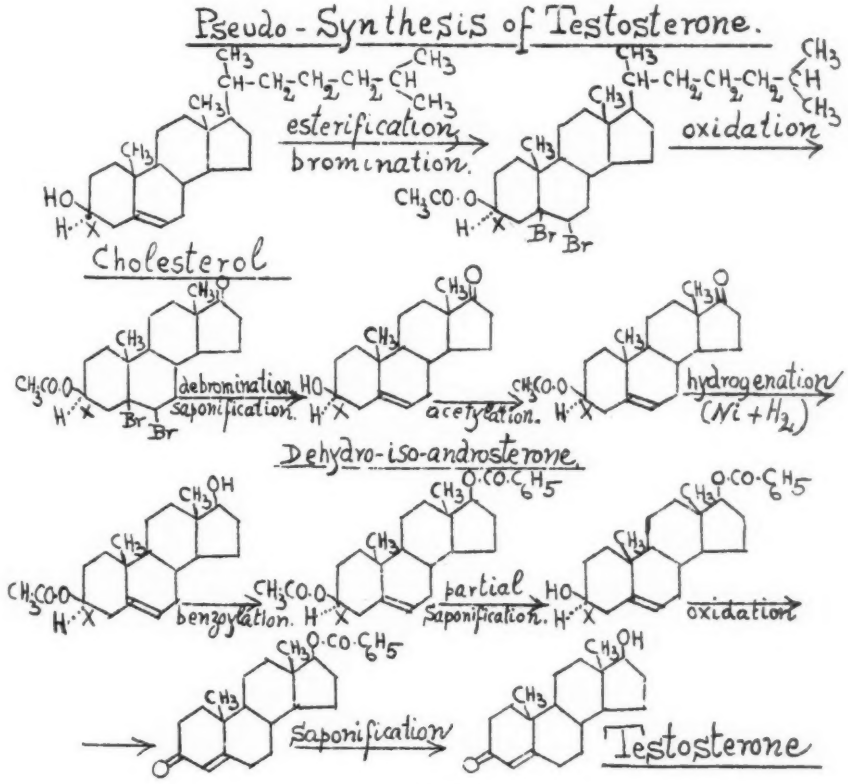
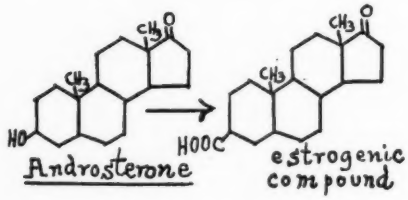


Table 3

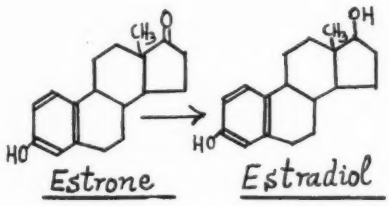
double bond. Oxidation splits off the whole side chain and yields a ketone. Debromination and subsequent saponification yields the male hormone dehydro-iso-androsterone. The acetyl ester of the latter is hydrogenated in a way which transforms the keto group into a secondary alcohol group, but which leaves the double bond intact. The newly-formed alcohol group is esterified with benzoic acid. This mixed ester may be saponified in a way which splits off merely the acetyl group. The free alcohol group is transformed into a keto group by oxidation and thus the benzoyl derivative of testosterone is obtained, which has simply to be saponified in order to yield testosterone.

In connection with the great number of syntheses which have been carried out in the realm of the sex hormones, numerous physiologically active compounds have been obtained which may not occur in nature. It was found, for instance, that by hydrogenation of estrogenic compounds one may obtain saturated compounds which give a positive response in the capon test.[26] In general, one may make the assumption that an estrus-producing compound must always contain an unsaturated ring system with at least one benzene ring, as in the case of the naturally occurring estrogenic hormones. Marker and Kamm[27] recently demonstrated, however, that on replacing the OH group in the androsterone molecule by a carboxylic group one may obtain an estrus-producing compound which thus contains a completely saturated ring system.

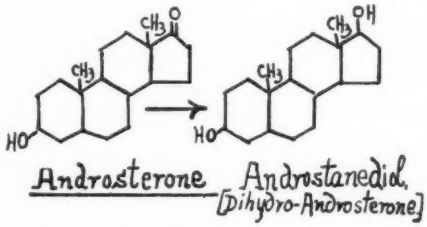


This example shows again how difficult it is to fix general rules for the interrelationship between chemical constitution and physiological or pharmacological action.

By hydrogenation of estrone Schwenk[23] obtained in 1933 the estradiol, which is more effective than the parent ketone.



Two years later it developed that estradiol is likewise a naturally occurring estrogenic hormone and could be obtained from follicular fluid[17] as well as from pregnancy urine.[16] An analogous reaction is the reduction of the keto group of androsterone.[28]



The androstanediol thus obtained is four times as effective (capon units as well as seminal vesicle units) as androsterone. It has not yet been obtained from natural material. There is, however, a great likelihood that it occurs also in nature.

Since androsterone and testosterone are alcohols, they can readily be transformed into esters. Esters of different carboxylic acids were prepared especially in the series of testosterone[29] and were examined by Tschopp[30] in Basle (Switzerland). They were found to have a tremendous effect on the development of the seminal vesicles in rats, and the effectiveness increases with the number of the carbon atoms of the carboxylic acids. The maximum activity was found in the series propionic ester→valerianic ester. In these cases the effect was 12 to 17 times larger than that of the free testosterone. There is no convincing explanation for this interesting fact, but it may be that the free compound is absorbed too quickly, perhaps being eliminated paired with glucuronic acid; thus it is not economically utilized. The ester, however, may gradually be split within the body, thus exerting a greater effect. On the other

hand, it is also possible that the esters as such bring about the pharmacologic effect.

It is interesting that the action of testosterone on the seminal vesicles can be considerably enhanced by the presence of a certain substance, the chemical nature of which is thus far unknown. Laqueur[31] calls it simply "X-substance." It was observed that the effect of testosterone depends very much on the kind of solvent in which the latter is dissolved. If oil is used which has been standing for a long time in the open air and which thus contains free fatty acids the effect is remarkably increased. Possibly the "X-substance" is related somehow to the higher fatty acids, since Tschopp[32] and others[33] were able to multiply the activity of testosterone likewise by the simultaneous administration of a certain quantity of a higher fatty acid (palmitic acid). The increased effectiveness is not obtained if the fatty acid is injected separately, so that it is almost certainly due to alteration of the conditions of absorption of the hormone at the site of injection rather than to any synergism at the site of action. It should be said that the activity of the highly effective esters of testosterone is not increased by the presence of the "X-substance." Moreover, the optimal ester effect, as in the case of the propionate, is remarkably higher than the increased activity brought about by a combination of testosterone and "X-substance."

Before giving clinical consideration relating to the subject, a few well-established facts should be mentioned. There exists an equlibrium between the function of the anterior pituitary and that of the gonads in females as well as in males. An increased hormone output in the gonads causes an inhibitory effect on the pituitary which in turn lessens its stimulation of the gonads. It follows that an exceedingly high dosage of sex hormones may produce a damaging effect on the gonads.

The influence of the sex hormones on the accessory sex organs as well as on the secondary sex characteristics has been discussed at length. It must be borne in mind that the sex hormones do not act on the gonads proper. Thus in case of gonadal insufficiency a curative effect cannot be expected from the administration of specific sex hormones. Only gonadotropic hormones, obtained from the anterior pituitary or from other sources, may be able to bring about such an action. Nevertheless, the application of reasonable doses of specific sex hormones may be helpful in so far as it will stimulate the development of the secondary sex characteristics.

Undoubtedly the development of the prostate gland is connected somehow with the action of the male sex hormones. It was mentioned previously that the action of the different male hormones on this gland is not equal. Moreover, it should be stated also that estrogenic hormones exert an influence on the prostate.[11] Therefore, clinical hypertrophy of this gland probably represents a very complicated endocrinological problem. Among others, Laqueur[34] favors the treatment of prostatic hypertrophy by the administration of male sex hormones. He reports an improvement in two-thirds of 133 cases. The treatment of this condition with male hormone products is based on the effects of estrogenic hormones on young castrated mice and rats in the absence and presence of male hormone injections. In the absence of male hormone injections, estrogenic material causes the appearance of flat epithelial cells with cornification in place of the normal columnar epithelium of the prostate, and also a marked thickening of the connective tissue and smooth muscle of the seminal vesicles and vas deferens. If male sex hormone is injected without the estrogenic material or in proper amounts with the estrogenic material into castrated mice, these changes in the epithelium and muscle are not observed. Laqueur states that in prostatic hypertrophy we may have an improper balance between male and estrogenic hormones; hence the abnormal changes leading to hypertrophy.

A few recent investigations of Steinach might be briefly mentioned, although I confess with some temerity. It is known that many years ago this worker[5] claimed to have secured an increased internal secretion of the testes by means of the ligation of the vas deferens. Besides other effects a hyperemic action on the male organism was demonstrated in the brain, and certain desirable psychic effects were observed. In his last publication Steinach[20] investigated how far it is possible to obtain similar effects by the administration of chemically pure sex hormones. He found that the hyperemic action cannot be brought about by any of the male sex hormones, but only by estrogenic substances. The psychic effect could be obtained by the administration of male hormone preparations alone, but it was considerably augmented by the

addition of a certain quantity of the estrogenic preparation "progynon-B," to-wit: 2.5 times with androsterone, 10 times with testosterone. Steinach is of the opinion that this effect cannot be likened to the results obtained with the "X-factor." The latter has to be injected at the site of the application of the male hormone. The injections of the male and female hormones by Steinach were made at different sites and at different times during the day. Thus it is not an alteration of the conditions of absorption, but (he believes) a real activation of the central nervous system. Steinach likewise treated a few clinical cases which had not responded to treatment with "proviron," that is, androsterone benzoate. When "proviron" was given in combination with the estrogenic preparation "progynon-B," a spontaneous psychic effect was said to have been observed, including improvement of the mental depression, enhanced resistance against physical or mental strain, cessation of sleeplessness and headaches. Also in a case of sexual impotence this form of treatment is said to have been beneficial. To my auditors and clinicians in general, however, must be left the interpretation and possible further application of these results.

The clinical considerations cannot be concluded without warning[35] against the promiscuous use of the different male sex hormone preparations. Chemists and physiologists have accomplished remarkable work in this field in the very recent past. Valuable substances have now been placed at the disposal of the clinician, and the direction in which results may be expected have been indicated. There are no general rules regarding the therapeutic usefulness of the different male hormone preparations, and experience with the materials still has to be obtained in the clinical workshop.

The older therapeutic products are rather crude extracts which are physiologically standardized. The newer preparations represent solutions of chemically pure male sex hormones. They have been available on the market in this country for only a few months, but in the hands of experienced clinicians they seem destined to supplement greatly the medical stock-in-trade. Among them, testerone propionate plays a predominant role.

BIBLIOGRAPHY

1. Pezard: Compt. rend., **153**:1027, 1911.
2. Gallagher, T. F.; and Koch, F. C.: Jour. Biol. Chem., **84**: 495, 1929.
3. Butenandt, A.; and Tscherning, K.: Hoppe-Seylers Zeitschr. Physiol. Chem., **229**:167, 1934.
4. Dessau, F.: Acta brevia Neerland, **5**:139, 1935.
   Fussgaenger, R.: Medizin und Chemie, Bayer-Meister Lucius, Band II, p. 194, 1934.
   Tschopp, E.: Klin. Wochenschr., **14**:1064, 1935.
5. Steinach, E.: Zur Geschichte des maennlichen Sexualhormons und seiner Wirkungen am Saeugetier und beim Menschen. Im Anschluss an neue eigene Forschungen. Wiener Klin. Wochenschr., Nos. 6-7, 1936.
6. Voss, and Loewe, S.: Klin. Wochenschr., No. 42, 1931.
7. Tscherning, K.: Angewandte Chemie, **49**:13, 1936.
8. Butenandt, A.; Dannenbaum, H.; Hanisch, G.; and Kudszus, H.: Hoppe-Seyler's Zeitschr. Physiol. Chem., **237**:57, 1935.
9. Gallagher, T. F.; and Koch, F. C.: Jour. Biol. Chem., **104**:611, 1934.
10. David, K.; Dingemanse, E.; Freud, J.; and Laqueur, E.: Hoppe-Seyler's Zeitschr. Physiol. Chem., **233**:281, 1935.
11. Tschopp, E.: Untersuchungen ueber die Wirkung der maennlichen Sexualhormone und ihrer Derivate. Archives Internationales de Pharmacodynamie et de Therapie, **52**:393, 1936.
12. Ogata, A.; and Hirano, S.: Jour. Pharm. Soc. Japan, **54**: 199, 1934. Chemisches Centralblatt, **2**:66, 1935.
13. Ruzicka, L.; and Wettstein, A.: Helvetica Chimica Acta, **18**:1264, 1935.
14. Reichstein, T.: Helvetica Chimica Acta, **19**:223, 1936.
15. Reichstein, T.: Helvetica Chimica Acta, **19**:1116, 1936; see also Callow, R. K.; and Parkes, A. S.: Proc. Physiol. Soc., March 14, 1936. Jour. Physiol., **87**:28, 1936.
16. Wintersteiner, O.; Schwenk, E.; and Whitman, B.: Proc. Soc. Exper. Biol. & Med., **32**:1087, 1935.
17. MacCorquodale, D. W.; Thayer, S. A.; and Doisy, E. A.: Jour. Biol. Chem., **115**:435, 1936.
18. Butenandt, A.; and Kudszus, H.: Ein Beitrag zur Genese der Keimdruesenhormone. Hoppe-Seyler's Zeitschr. Physiol. Chem., **237**:75, 1935.
19. Dorfman, R. I.; Gallagher, T. F.; and Koch, F. C.: Endocrinology, **19**:33, 1935.
20. Steinach, E.; Kun, H.; and Peczenik, O.: Beitraege zur Analyse der Sexualhormonwirkungen. Tierexperimentelle und klinische Untersuchungen. Wiener klin. Wochenschr., No. 29, 1936.
21. Butenandt, A.; and Schmidt, J.: Ber. d. Deutsch. Chem. Ges., **67**:1901, 1934.
    Butenandt, A.; and Westphal, U.: Ber. d. Deutsch. Chem. Ges., **67**:2085, 1934.
    Fernholz, E.: Ber. de. Deutsch. Chem. Ges., **67**:1855, 2027, 1934.
22. Marker, R. E.; Kamm, O.; Oakwood, T. C.; and Laucius, J. E.: Jour. Amer. Chem. Soc., **58**:1503, 1936.
23. Schwenk, E.; and Hildebrandt, F.: Naturwissenschaften, **21**:177, 1933.
24. Fieser, L. F.: The Chemistry of Natural Products Related to Phenanthrene, p. 231. New York: Reinhold Publishing Corporation, 1936.
25. See: Ruzicka, L.: Zusammenhaenge in der Reihe der Sexualhormone. Helvetica Chimica Acta, **19**:E95-E98, 1936.
26. Dirscherl, W.; Kraus, J.; and Voss, H. E.: Hoppe-Seyler's Zeitschr. Physiol. Chem., **241**:1, 1936.
    Schoeller, W.; Schwenk, E.; and Hildebrandt, F.: Naturwissenschaften, **21**:286, 1933.
27. Marker, R. E.; Kamm, O.; Oakwood, T. S.; and Laucius, J. T.: Jour. Amer. Chem. Soc., **58**:1948, 1936.
28. Ruzicka, L.; Goldberg; and Meyer, J.: Helvetica Chimica Acta, **18**:210, 1935.
    Butenandt, A.; and Tscherning, K.: Hoppe-Seyler's Zeitschr. Physiol. Chem., **234**:224, 1935.
29. Ruzicka, L.; and Wettstein, A.: Helvetica Chimica Acta, **19**:1141, 1936.
30. Miescher, K.; Wettstein, A.; and Tschopp, E.: Schweiz. Med. Wochenschr., **66**:763, 1936.
31. See: Ruzicka, L.; Zusammenhaenge in der Reihe der Sexualhormone. Helvetica Chimica Acta, **19**:E104, 1936.
32. Miescher, K.; Wettstein, A.; and Tschopp, E.: Schweiz. Med. Wochenschr., **66**:310, 1936.
33. Deanesly, R.; and Parkes, A.: Male Hormones and the Question of Accessory Substances. Lancet, **1**:837, 1936.
    Parkes, A. S.: Increasing the Effectiveness of Testosterone. Lancet, **2**:674, 1936.
34. Lit. cit. by Koch, F. C.: Jour. Urol., **35**:394, 1936.
35. Editorial, J.A.M.A., **107**:1390, 1936.

DISCUSSION (*Abstract*)

Dr. Carl G. Hartman, Baltimore, Md.—Many surprises are in store for the experimenter who concerns himself with the physiological action of the group of compounds ably presented by Dr. Ehrenstein, including as they do the gonadol sex hormones as well as certain carcinogenic agents. Such an apparently simple matter as the interrelations of progesterone, estrogenic hormones, and the male hormones (androsterone, testosterone) must be studied further. It is true that estrin produces growth of the female secondary sex organs (vagina, uterus, tube, breast, nipple) while the male hormone has a selective action on the male secondary sex characters (prostate, seminal vesicles, penis or clitoris). In studying histologically the effect of administration of the hormones attention must be given to both the connective tissue framework of the organ and its vascular supply and to the epithelial structures, a point much neglected thus far. The problem of prostate hypertrophy, for example, will not be solved without more complete study.

There is no evidence as yet that one of the hormones can be transmuted into another within the mammalian organism. Sex antagonism had been greatly exaggerated until Moore took the matter up for closer analysis. Yet Markee and I found that testosterone caused a regression of the monkey endometrium, and this may be cited as an example of the male hormone's opposing the action of estrin. There may be overlapping of action also, as when testosterone fully replaces progesterone in producing alveoli in the mammary glands of the monkey. What the function of estrin is in the male, or androsterone in the female is not at all known.

So far there has emerged out of the vast amount of study on the sex hormones (gonadal, placental, hypophyseal) very little of use to the clinician. A glowing example of the enrichment of his armamentarium is the discovery by Robert Lewis, corroborated by TeLinde, that estrin will cure gonorrheal vaginitis in prepubertal girls. Prolan has been found helpful in cases of non-descent in stimulating the descent of the testis (Engle), in a large majority of cases. On the whole, however, the use of the laboratory products may be said to be in the experimental stage and some are already discarded. As an aphrodisiac the male sex hormone is a failure. In further development of a rational therapeusis by sex hormone administration the clinician must join hands with the experimental laboratory. He may do this first by having his patients carefully examined for their hormonal output, and second, on this rational basis, boldly experimenting with products of known physiological action.

Southern Medical Journal

JOURNAL OF THE

SOUTHERN MEDICAL ASSOCIATION

Copyright, Southern Medical Association, 1937. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription, $4.00. Single copies, 35c each.

Entered as second-class matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

M. Y. DABNEY, M.D., Editor
EUGENIA B. DABNEY, M.S., Associate Editor
C. P. LORANZ, Secretary, Treasurer and General Manager

Volume 30 FEBRUARY 1937 Number 2

EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Thirty-First Annual Meeting
New Orleans, Louisiana, November 30-December 1-2-3, 1937

SALICYLATES AND VITAMINS

There are various drugs which increase or diminish secretion in the alimentary tract, or alter the composition of digestive juices. Histamine causes an outpouring of gastric juice, and at times of hydrochloric acid in an anacid stomach. In old age, the quantity of stomach secretion is low and the hydrochloric acid content is also reduced. In the disease pernicious anemia there is a greatly diminished gastric secretion, which rises, however, when remissions are induced by liver feeding.[1] Many drugs cause a temporary stimulation of the output of the salivary glands and kidneys. One of the effects of acetyl salicylic acid ("aspirin") is to increase the output of uric acid;[2] another is upon the metabolism of vitamin C.

Deficiency of C, the antiscorbutic vitamin, causes capillary oozing and soreness of joints, and for this reason crystalline C has received clinical trial in many bleeding and arthritic conditions. Tests for C deficiency have become popular, and various methods have been described for estimating the body requirement of this accessory food factor. C is found in normal human blood, and a normal fasting level has been suggested,[3] like that for other blood constituents such as calcium, sodium, urea, or sugar. The amount of C in the blood varies with the nutritional history; it rises usually very promptly when the vitamin is taken by mouth. A low fasting level may be restored to normal in a comparatively few days or weeks. The body is incapable of storing large quantities, however, and patients who receive more than the daily requirement soon begin to excrete the excess in the urine. The vitamin is also excreted through the skin in perspiration, and is secreted into human milk[4] in amounts dependent on the dietary intake.

Deficiency may be detected by estimation of the fasting blood level. An older test depends upon the observation of a rise of urinary C after the vitamin has been administered by mouth. If urinary excretion fails to rise after concentrated vitamin is given, it is assumed that the tissue supply was inadequate, that the tissues were unsaturated or in need of the vitamin, and that C should be administered until an excess may be detected in the urine.

Ether anesthesia[5] is reported to increase the urinary output of vitamin C. Acetyl salicylic acid would appear to be another medicament which raises the output of antiscorbutic vitamin. According to Daniels and Everson,[5] urinary excretion of C by children on a constant adequate diet is very constant. If "aspirin" is given, with no other change in the ration or increase of the vitamin supply, the urinary C sharply rises. Excretion of C increases. This effect is of much interest because of the large quantities of the drug which are taken by the public for colds or headache, and because the drug apparently wastes vitamin or diminishes its utilization in the body.

Rinehart[3] has reported a frequent association of scurvy and rheumatoid arthritis in patients to whom salicylates have been administered. Association of a mild scorbutic state with the heart

1. Goldhamer, S. M.: Gastric Juice in Patients with Pernicious Anemia in Induced Remission. Amer. Jour. Med. Sci., **193**:23 (Jan.) 1937.

2. Cushny: Pharmacology and Therapeutics. Philadelphia: Lea & Febiger, 1928, quoted by 5.

3. Greenberg, L. D.; Rinehart, J. F.; and Phatak, N. M.: Studies on Reduced Ascorbic Acid Content of Blood Plasma. Proc. Soc. Exper. Biol. & Med., **35**:135 (Oct.) 1936.

4. Chu, F. T.; and Sung, C.: Effect of Vitamin C Administration on Vitamin C of Milk and Urine of Lactating Mothers. Ibid, p. 171.

5. Daniels, A. L.; and Everson, G. J.: Influence of Acetyl Salicylic Acid (Aspirin) on Urinary Excretion of Ascorbic Acid. Ibid, p. 20.

lesion of acute rheumatic fever has been suggested by pathologists.

Present evidence would indicate that acetyl salicylic acid may increase the requirement of the body for vitamin C, and in view of the widespread use of the drug, the matter would seem to bear further investigation.

BREATHING MACHINE

Medicine, aviation and the radio industry have long made excellent use of delicate apparatus dependent on electrochemical principles which even the learned may find difficult to explain. It is surprising that the man who can push a button can extract sound from air, catch a radio beam to guide an airship, or start an x-ray current which may expose the inner mechanics of a living person. The laws of physics and mathematics may serve a very ordinary individual who knows nothing of the wave or corpuscular theory of light, or one with technical training along an entirely different line. The photo-electric cell, an instrument for controlling force of great or slight intensity by fluctuations of a beam of light, is a delicate mechanism which seems to have very nearly human intelligence. It is tireless, and has been employed to direct a variety of instruments. It has recently been adapted by Barach and Eck,[1] of New York, for control of a respiration apparatus which has proven itself valuable in several types of dyspnea.

A new principle of treatment of asthma and other conditions of difficult respiration was introduced by Barach[2] in 1935. It consisted of presenting to the patient for breathing a mixture of gases more volatile than the ordinary air. Helium and oxygen were used instead of the customary nitrogen-oxygen mixture of the atmosphere. Helium is one of the lightest of gases, and for this reason popular for filling balloons. Its atomic weight is four, while that of nitrogen, which ordinarily makes up about four-fifths of the atmosphere and enters the body without reacting with it, is given by Barach as twenty-eight. The lighter helium diffuses mechanically, carrying the oxygen into the patient's lungs, just as a light liquid will flow through small openings which a viscid one will not enter; the mixture moves against a resistance which ordinary air cannot penetrate. Clinically, the helium-oxygen mixture is reported to be beneficial in cases of severe asthma and other obstructive dyspneas.

The discoverer of this treatment felt the need of varying the pressure of the gases in the machine for inspiration and expiration, with an alternating pressure for expansion and contraction of the lungs. A means of attaching a photo-electric cell to control gas pressure was developed. Its activation depended upon a shifting beam of light and the opening and closing of a valve in the gas chambers. The opening and closing of the valve produced the desired alternating pressures as the patient breathed.

The apparatus, though delicate, was found practical for use in hospital wards. It has also been tried for resuscitation. If it can be adapted for this use, it should be more effective than the first aid arm-chest exercises or pulmotors known to firemen and boy scouts for revival of drowned or asphyxiated persons. It might aid obstetricians in the resuscitation of blue babies, or possibly be useful for those whose lungs are paralyzed by poliomyelitis, or whose respiration is depressed by spinal anesthesia.

1. Barach, A. L.: and Eck, M.: Use of a Photo-electric Cell in Respiration Apparatus. Proc. Soc. Exper. Biol. & Med., **35**: 295 (Nov.) 1936.

2. Barach, A. L.: The Use of Helium in the Treatment of Asthma and Obstructive Lesions in the Larynx and Trachea. Ann. Int. Med., **9**:739, 1935.

GLEANINGS FROM RECENT JOURNALS

Nerve Lesions in Early Poliomyelitis.—The descent of the virus in experimental infantile paralysis through the organs of smell to the brain and spinal cord has been demonstrated by inoculation of monkeys with portions of nervous tissue taken from different areas of infected animals at varying periods after inoculation. It has thus been shown that an extensive invasion of this portion of the body occurs before paralysis sets in. The method of tracing the viral pathway by removing bits of tissue and inoculating them into another monkey is obviously laborious and extravagant of laboratory animals. Faber,[1] of Stanford University, has attempted to develop a staining technic to study the spread of the virus from the olfactory bulbs, without secondary inoculations.

Using a method which McClellan and Goodpasture employed in investigation of herpetic encephalitis, a disease which travels by the same route, Faber stained with trypan blue the nervous

1. Faber, H. K.: Visualization of Preparalytic Lesions of Poliomyelitis by Intravital Staining. Proc. Soc. Exper. Biol. & Med., **35**:10 (Oct.) 1936.

tissues of monkeys on the third and sixth days after inoculation, before they developed paralysis. The stain of course demonstrated pathologic tissue changes; it did not visualize the ultramicroscopic virus. An early change consisted in the appearance of areas of capillary dilatation. Spinal cord invasion was distinctly visible six days after inoculation, when the animal had no clinical symptoms of the disease. The brain stem and other nervous tissues showed pathologic staining at this time. The earliest reaction to virus invasion was hyperemia, which began about the third day and was extensive by the sixth. It was not detected, however, in the olfactory bulbs, which are known to contain a high concentration of virus. No abnormality of the infected olfactory bulbs was demonstrated by staining.

Note for Brewers.—The wine industry was the subject of the first great bacteriologic investigations of Louis Pasteur, who, after showing Frenchmen that microscopic organisms were the cause of the spoiling of the wine of a certain region, went on to the discovery of the cause of anthrax in sheep and rabies in humans, and prepared a vaccine against each.

As the scientific *motif* of the last twenty-five years of the Nineteenth Century was bacteriology, so that of the present century is physics, particularly studies of light. Industry and medicine alike profit by investigations on the nature of light, a term which in its broad sense includes long radio waves, infra red rays of heat, the narrow range of the visible color spectrum, the ultraviolet just beyond this, down through the x-rays and radium emanation. Ultraviolet, which is invisible light, is responsible for human sunburn, is used in combating tuberculosis, rickets and other diseases and in the making of vitamin D in the skin. Ultraviolet irradiation, if properly applied to yeast, will increase its capacity to produce ethyl alcohol in beer,[1] will make beer more alcoholic. Science has thus again turned its searchlight to benefit an ancient industry.

Fertility and Vitamin Sources.—Vitamin E, a fat soluble factor from wheat germ, lettuce and other sources, is believed to have a special function in reproduction. In its absence the fetus cannot develop normally.

In the bee hive, as is well known, the queen is fertile and lays many eggs and the workers are neuter in gender; and the difference lies wholly in the nourishment of the young. Larvae destined to become queens are fed on royal jelly, which since it produces a very fertile insect, ought to be full of the fertility vitamin. Different reports have appeared as to the quantity of vitamin E in royal jelly. Mason and Melampy,[1] of Vanderbilt University and the United States Department of Agriculture obtained enough of this material for rat tests. They gave it in large amounts to a group of animals on an E-deficient diet to determine whether it would help them carry their fetuses to maturity. It was reported that the rats fed on royal jelly were as sterile as the controls.

Vitamin E is generally believed to have a specific role in the activity of the sex glands and pituitary. This is erroneous, according to the Vanderbilt workers, who report that E is necessary for nuclear activity of cells in general, and for their rapid division, rather than for ovarian or testicular function.

The attempt to assign control of a specific tissue to any vitamin is fraught with difficulty. There are also no doubt many pitfalls to be encountered in tracing parallels in insect and mammalian nutrition. The queen bee apparently does not owe her egg-laying capacity to vitamin E.

1. Beckwith, T. D.; and Donovick, S. E.: Increase in Production of Ethyl Alcohol by Yeast Treated with Ultraviolet Energy. Proc. Soc. Exper. Biol. & Med., **35**:36 (Oct.) 1936.

1. Mason, K. S.; and Melampy, R. M.: Absence of Vitamin E in the Royal Jelly of Bees. Proc. Soc. Exper. Biol. & Med., **35**: 459 (Dec.) 1936.

TWENTY-FIVE YEARS AGO

From Journals of 1912

Oklahoma is Southern.[2]—"Editors Southern Medical Journal: I notice in the December number of the Journal that in Article 3 of the Constitution only certain states are admitted to membership.

"Two bordering on this, the State of Oklahoma, namely, Arkansas and Texas, are admitted. What have we done to be left out? We are practically all Southerners, most of us from Southern schools. We are young, but so is the Association. We have not yet had the chance to come forward. Oklahoma belongs in this group. At our constitutional convention for statehood we had 102 Democratic delegates and 10 Republicans. This is not mentioned as a reason for admittance, for politics should play no part in a medical association, but merely to remind you that we are in the South.

"We have the goods, and I believe we are justly entitled to come in.

"Ira W. Robertson.

"P. S.—Enclosed fee for 1912 subscription."

2. Sou. Med. Jour., **5**:215, 1912.

Premedical Requirements.[1]—"University of Alabama School of Medicine, Mobile, Alabama. * * * The forty-sixth session begins Monday, September 18, 1911, and ends May 8, 1912. Entrance Requirements—The completion of a four years' high school course, or other equivalent of 14 Carnegie units. * * *" [*Advertisement.*]

Fee Splitting.[2]—"An advertisement by a quack concern, the Electro Radio Company, occupying four columns of expensive space, headed by black letters three-quarters of an inch high [Mobile Sunday papers] warns the reader:

"'Are we being scared into operations and sold to the highest bidder to be slaughtered by physicians at so much a head because they want the money? If your life is worth ten cents, you better read this. * * * Confessions by Dr. Chas. A. L. Reed, A.M., M.D.'

"The advertisement details the eminence of Dr. Reed and quotes the sensational introduction written by the editor of Pearson's for the doctor's article, the theme of which is fee-splitting. Dr Reed seems to be confessing despair of seeing the corrupt practice corrected by the profession itself."

1. Sou. Med. Jour., **5**:40, 1912.
2. Editorial, Sou. Med. Jour., **5**:279, 1912.

Book Reviews

A Text-book of Obstetrics. By Edward A. Schumann, A.B., M.D., F.A.C.S., Professor of Obstetrics, School of Medicine, University of Pennsylvania; Surgeon-in-Chief, Kensington Hospital for Women; Gynecologist and Obstetrician to Philadelphia General and Memorial Hospitals; Obstetrician to Chestnut Hill Hospital; Consulting Gynecologist to Frankford, Jewish, Burlington County and Rush Hospitals. 780 pages, illustrated. Philadelphia: W. B. Saunders Company, Publishers, 1936. Cloth, $6.50.

The object of the book, to present the art and science of obstetrics as it is regarded at this time, has been well realized. The modern attitude of the writer is illustrated by the inclusion of a chapter on analgesia and anesthesia. In this the various methods now used to obtain relief from pain during labor and delivery are discussed. Little space is devoted to the influence of the endocrine system upon the reproductive cycle, but the summary of the present knowledge is concise and clear. The technic of the biological pregnancy tests is described fully and the value of the tests indicated.

The suggestions as to the management of pregnancy and labor are practical and sane. The author emphasizes the importance of adequate prenatal supervision. He advocates a routine vaginal examination under sterile conditions early in labor, which is not in accord with the general opinion in this country, but for the most part his treatment throughout is conservative. The discussion of the use of forceps is well illustrated. This section includes a description of the application of instruments in abnormal presentations and directions for the use of Kielland, Barton and Piper forceps, as well as for the classical instruments.

The book is definite in its recommendations as to treatment without being didactic. It is unusually readable; at the same time the material is arranged conveniently for reference. It should be valuable both to the student and the practitioner.

Allergic Diseases; Their Diagnosis and Treatment. By Ray M. Balyeat, M.A., M.D., F.A.C.P., Associate Professor of Medicine and Lecturer on Diseases Due to Allergy, University of Oklahoma Medical School; Chief of the Allergy Clinic, University Hospital. Assisted by Ralph Bowen, B.A., M.D., F.A.A.P., Chief of Pediatric Section Balyeat Hay Fever and Asthma Clinic, Oklahoma City, Oklahoma. Fourth Edition. 516 pages, illustrated. Philadelphia: F. A. Davis Company, Publishers, 1936. Price, $6.00.

Dr. Balyeat has extensively rewritten and rearranged this new sixth edition of his very interesting book. He has added, among other chapters, a short chapter on the emanations of flies as causes of asthma and hay fever, one on molds and fungi, and a more complete one on the use of iodized oil intratracheally in the treatment of asthma.

It is only natural that a man who works in the Southwest should seem to over-emphasize the importance of pollens in allergy. However, the sections of the book dealing with that side of the question are both interesting and instructive. The charts, showing the geographical distribution of the various pollens, as well as those showing the important pollens in the various sections, are good.

The book is written for the general practitioner and will make a valuable addition to the library of any physician who wishes to become acquainted with allergy. The apparent reason for the new edition is the new chapter on Dr. Balyeat's hobby, iodized oil.

The Harvey Lectures. Delivered Under the Auspices of the Harvey Society of New York, 1934-1935. Under the Patronage of the New York Academy of Medicine. By Dr. Wm. Bosworth Castle; Dr. William Cumming Rose; Dr. Wilbur A. Sawyer; Dr. Alfred N. Richards; Dr. E. C. Dodds; Dr. G. V. Anrep; Dr. Francis G. Blake; Dr. John N. Northrop. Series XXX. 270 pages, illustrated. Baltimore: The Williams & Wilkins Company, 1936. Cloth, $4.00.

The Harvey Lectures usually represent brief reviews of various medical subjects by individuals who are making active contributions in the various fields. This volume is well up to the high standard set by the previous published lectures. The short article by Castle summarizes most of the important investigations made by him and his associates in regard to primary and related anemias. Richard's lecture deals in an interesting way with the work of the last ten years on the mechanism of urine formation. Although knowledge along this line is not yet complete, more progress has been made recently than in the preceding fifty years, and no one has contributed more to this progress than Richards, as the reader will readily recognize. Anrep's lecture likewise serves to clarify many of the disputed points in regard to the regulation of the blood flow in contracting muscles. The other articles in the book are of equal value. Although of especial importance for libraries, the series of volumes containing the Harvey lectures have much useful information for students and practitioners.

Handbook of Surgery. By Erick C. Mekie, M.B., Ch.B., F.R.C.S. (Edin.), Medical Officer, Malayan Medical Service; formerly University Tutor, Royal Infirmary, Edinburgh; Assistant, Department of Clinical Surgery, University of Edinburgh; Surgical Specialist, Military Hospital, Scottish Command. With a Foreword by John Fraser, M.C., M.D., Ch.M., F.R.C.S.E., Regius Professor of Clinical Surgery, University of Edinburgh. 699 pages, illustrated. Baltimore: William Wood & Company, 1936. Cloth, $4.50.

Mekie has written a synopsis of surgery that includes a great deal, tells a little about each subject and does it quickly. Detailed methods of treatment are not included nor is the technic of surgical operations. To the student preparing for an examination or desiring to orient his knowledge and to the busy practitioner this book should prove invaluable.

Southern Medical News

THE NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

The First Annual Meeting of the New Orleans Graduate Medical Assembly will be held in New Orleans at the Roosevelt Hotel March 8-9-10-11. There will be clinical sessions with presentations by outstanding clinicians and teachers from the leading medical centers of the country. Each day there will be luncheons and round table discussions. The program on Monday evening will be in conjunction with the Orleans Parish Medical Society. There will be scientific and technical exhibits. All sessions and exhibits will be held at the Roosevelt Hotel. Dr. Hyder F. Brewster is General Chairman. Officers of the Assembly are: Dr. Thomas Benton Sellers, President; Dr. Lucien A. LeDoux, Vice-President; Dr. William H. Gillentine, Secretary; Dr. Francis E. LeJeune, Treasurer; Dr. Frederick L. Fenno, Director of Clinics.

SOUTHEASTERN SURGICAL CONGRESS

The Eighth Annual Assembly of the Southeastern Surgical Congress will be held in Louisville, Kentucky, March 8-10 at the Brown Hotel. There will be three full days of intense postgraduate lectures and one public meeting with thirty-seven of the country's most outstanding surgeons making presentations. At the public session the C. Jeff Miller Lectureship will be given, honoring the late Dr. C. Jeff Miller, of New Orleans. A round table will be held each day at noon and the regular annual banquet will be given in the ballroom of the Brown Hotel on Tuesday evening. Program will be available around February 15. For information write Dr. B. T. Beasley, Secretary-Treasurer, 701 Hurt Building, Atlanta, Georgia.

DALLAS SOUTHERN CLINICAL SOCIETY

The Dallas Southern Clinical Society will hold its ninth annual Spring Clinical Conference at Dallas, Texas, Monday, Tuesday, Wednesday and Thursday, March 15-18 at the Adolphus Hotel, the conference headquarters. There will be general assemblies, afternoon clinics, round table luncheons, clinical-pathological conferences, evening symposia, postgraduate lectures, a Monday night smoker and a clinical dinner with entertainment on Thursday evening. And there will also be scientific and technical exhibits.

MID-SOUTH POSTGRADUATE MEDICAL ASSEMBLY

The Mid-South Postgraduate Medical Assembly, fifty-third annual meeting, will be held at Memphis, Tennessee, Tuesday, Wednesday, Thursday and Friday, February 16-19 at the Hotel Peabody. Clinical lectures and round table discussions each day. Dr. R. M. Adams, Ripley, Mississippi, is President, and Dr. A. F. Cooper, Goodwin Institute Building, Memphis, Tennessee, is Secretary.

ALABAMA

The Jefferson County Medical Society has elected the following officers for the coming year: Dr. Samuel L. Ledbetter, Jr., President; Dr. L. T. Kincannon, Vice-President; Dr. W. B. Hardy, Secretary-Treasurer (reelected); and Dr. Alfred A. Walker, Chairman Board of Censors; all of Birmingham.

Dr. James S. McLester, Birmingham, has been made Professor of Medicine at the University of Alabama School of Medicine.

Dr. H. Earle Conwell, Birmingham, was recently elected Secretary of the Clinical Orthopedic Society.

Dr. John Louden Hillhouse and Miss Virginia Jacobs, both of Birmingham, were married October 10.

DEATHS

Dr. Elisha L. Lee, Bridgeport, aged 96, died October 16.

Dr. Alonzo J. Marlar, Billingsley, aged 85, died October 10 of mitral insufficiency.

ARKANSAS

The Benton County Medical Society has elected the following officers for the coming year: Dr. E. A. Pickens, Bentonville, President; Dr. J. T. Powell, Gravette, Vice-President; Dr. George M. Love, Rogers, Secretary-Treasurer.

The Boone County Medical Society has elected the following officers for the coming year: Dr. J. H. Fowler, Harrison, President; Dr. D. E. Evans, Harrison, Vice-President; Dr. D. L. Owens, Harrison, Secretary-Treasurer.

The Craighead-Poinsett County Medical Society has elected the following officers for the coming year: Dr. P. W. Lutterloh, Jonesboro, President; Dr. W. H. Moreland, Tyronza, Vice-President; Dr. R. C. Shanlever, Jonesboro, Secretary-Treasurer.

The Cross County Medical Society has elected the following officers for the coming year: Dr. Ruffin Longest, Wynne, President; Dr. T. J. Stewart, Wynne, Secretary-Treasurer.

The Eighth Councilor District Medical Society has elected the following officers for the coming year: Dr. Robert Hood, Russellville, President; Dr. Joe F. Shuffield, Little Rock, Vice-President; Dr. Louis Dunaway, Conway, Secretary-Treasurer.

The Faulkner County Medical Society has elected the following officers for the coming year: Dr. L. S. Dunaway, Conway, President; Dr. R. L. Brittain, Conway, Vice-President; Dr. J. S. Westerfield, Conway, Secretary-Treasurer.

The Garland County Medical Society has elected the following officers for the coming year: Dr. D. C. Lee, Hot Springs National Park, President; Dr. G. A. Hebert, Hot Springs National Park, Vice-President; Dr. W. E. Gray, Hot Springs National Park, Secretary-Treasurer.

The Greene County Medical Society has elected the following officers for the coming year: Dr. R. J. Haley, Paragould, President; Dr. G. P. Bridges, Paragould, Vice-President; Dr. M. W. Majors, Paragould, Secretary-Treasurer.

The Hempstead County Medical Society has elected the following officers for the coming year: Dr. G. E. Cannon, Hope, President; Dr. P. B. Carrigan, Hope, Vice-President; Dr. Jim McKenzie, Hope, Secretary-Treasurer.

The Jefferson County Medical Society has elected the following officers for the coming year: Dr. B. D. Luck, Pine Bluff, President; Dr. H. A. Causey, Pine Bluff, Vice-President; Dr. H. Capel, Pine Bluff, Secretary-Treasurer.

The Lawrence County Medical Society has elected the following officers for the coming year: Dr. C. C. Ball, Ravenden, President; Dr. T. C. Guthrie, Smithville, Vice-President; Dr. Charles D. Tibbels, Black Rock, Secretary.

The Mississippi County Medical Society has elected the following officers for the coming year: Dr. Thomas F. Hudson, Luxora, President; Dr. C. M. Harwell, Osceola, Vice-President; Dr. F. D. Smith, Blytheville, Secretary-Treasurer.

The Monroe County Medical Society has elected the following officers for the coming year: Dr. M. L. Dalton, Grinkley, President; Dr. W. T. Bradley, Blackton, Vice-President; Dr. F. S. Dozier, Moro, Secretary-Treasurer.

The Ouachita County Medical Society has elected the following officers for the coming year: Dr. J. P. Clemens, Mount Holly, President; Dr. E. J. Byrd, Bearden, Vice-President; Dr. R. B. Robins, Camden, Secretary-Treasurer.

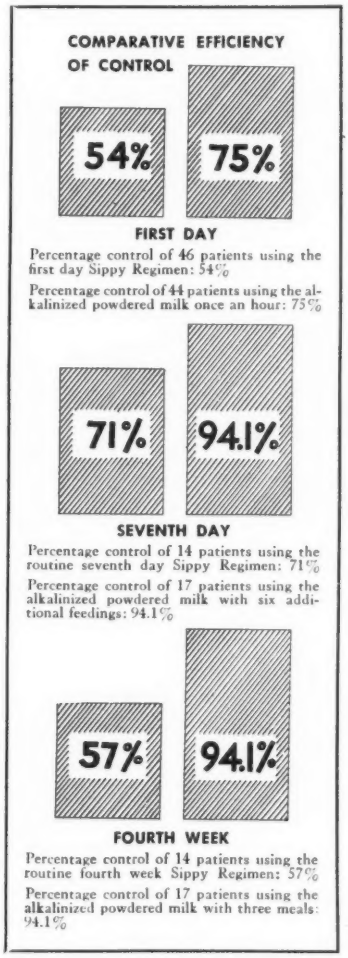
The Pulaski County Medical Society has elected the following officers for the coming year: Dr. Paul L. Mahoney, Little Rock, President; Dr. Val Parmley, Little Rock, Vice-President; Dr. Ernest H. White, Little Rock, Secretary; Dr. R. J. Calcote, Little Rock, Treasurer.

The Sebastian County Medical Society has elected the following officers for the coming year: Dr. J. W. Amis, Fort Smith, President; Dr. H. C. Dorsey, Fort Smith, Vice-President; Dr. L. M. Henry, Fort Smith, Secretary; Dr. W. R. Brooksher, Treasurer.

The Washington County Medical Society has elected the following officers for the coming year: Dr. W. A. Fowler, Fayette-

Continued on page 34

The Sippy Diet—
simpler, more effective
with KLIM *Powdered Whole Milk*


COMPARATIVE EFFICIENCY OF CONTROL
54%
75%
FIRST DAY
Percentage control of 46 patients using the first day Sippy Regimen: 54%
Percentage control of 44 patients using the alkalinized powdered milk once an hour: 75%
71%
94.1%
SEVENTH DAY
Percentage control of 14 patients using the routine seventh day Sippy Regimen: 71%
Percentage control of 17 patients using the alkalinized powdered milk with six additional feedings: 94.1%
57%
94.1%
FOURTH WEEK
Percentage control of 14 patients using the routine fourth week Sippy Regimen: 57%
Percentage control of 17 patients using the alkalinized powdered milk with three meals: 94.1%

SIMPLER and more effective control of gastric acidity is reported for the following modification of the Sippy Therapy*:

KLIM Powdered Whole Milk
12.5 gr.(1½ tablespoonfuls)
Water 90 c. c. (3 ounces)
Add alkali, and feed hourly

Volume for volume with the standard milk and cream mixture, this KLIM dilution provides 27% more protein for neutralization. Most important, the protein of KLIM forms finer curds, which present a *greater combining surface* to the gastric acid.

Your patients will appreciate the hourly regimen—*only 14 instead of 29 medications daily*. Patients will tell you, too, that KLIM is more economical, and that it keeps better, because specially packed. Stays fresh for weeks after opening. Available in drugstores everywhere.

Try KLIM in your next ulcer case. Send coupon to receive trial supply and further information on KLIM.

*Ann. Int. Med. Vol. 9, No. 8, Feb. 1936

THE BORDEN COMPANY

KLIM

The Borden Company, Dept. Y-27-K
350 Madison Avenue, New York City

Please send me samples and additional information on Klim.

_____ M. D.

Street _____

City _____ *State* _____

If you
TASTED
CEREVIM
you would prescribe it often

COMPOSED of whole-wheat, oatmeal, wheat germs, skimmed milk, yellow corn meal, dry brewers' yeast, salt, barley and malt — Cerevim is richer than ordinary cereal in protein and calcium and phosphorus. It provides in addition a generous amount of vitamins B_1 and G. Cerevim has a delightful taste which appeals strongly to children as well as to adults. Its continued use will not cloy the appetite.

LET US SEND YOU A SAMPLE OF THIS DELICIOUS NUTRITIOUS PRECOOKED CEREAL.

A note on your letterhead or prescription blank is all that is necessary.

Advertised only to the profession.

Hugh Tebault & Co., Inc.
GENERAL MOTORS BLDG., NEW YORK, N. Y.

Continued from page 242

ville, President; Dr. R. H. Huntington, Fayetteville, Vice-President; Dr. Fount Richardson, Fayetteville, Secretary-Treasurer.

The Drew County Medical Society has elected the following officers for the coming year: Dr. J. S. Wilson, Monticello, President; Dr. S. M. Gates, Monticello, Vice-President; Dr. J. P. Price, Monticello, Secretary-Treasurer.

The Woodruff County Medical Society has elected the following officers for the coming year: Dr. J. H. West, Grays, President; Dr. J. F. Hays, Augusta, Vice-President; Dr. L. E. Biles, Augusta, Secretary-Treasurer.

Dr. Val Parmley, Little Rock, has been made Chairman, and Dr. M. F. Lautman, Hot Springs National Park, has been made Secretary of the Southern Section of the American Congress on Physical Therapy.

Dr. H. H. McAdams, Jonesboro, has been made County Health Officer for Craighead County.

Dr. Hoyt R. Allen, Little Rock, has been made a Governor of the Chamber of Commerce of that city.

Dr. M. S. Craig, Batesville, has been made Vice-President of the Batesville Kiwanis Club.

Dr. G. R. Seigel, Clarksville, was recently named Coroner for Johnson County.

Dr. H. E. Mobley, Morrilton, has been made a member of the State Highway Commission.

Dr. Ross Maynard, Pine Bluff, has been made a Director of the Kiwanis Club of that city.

Dr. A. C. Shipp, Little Rock, was recently made a Steward in the Winfield Methodist Church.

Dr. W. W. Brown, Williford, has been made Coroner of Sharp County.

DEATHS

Dr. T. I. Mohler, Palestine, aged 92, died October 19 of arteriosclerosis.

Dr. Ellis L. Gibson, Alicia, aged 64, died November 23.

Dr. John M. Taylor, Mena, aged 68, died November 15.

DISTRICT OF COLUMBIA

Dr. Hugh S. Cumming, Surgeon General, U. S. Public Health Service, retired, and Past President of the Southern Medical Association, was recently presented with the Marcellus Hartley Gold Medal "for eminence in the application of science to the public welfare" by the National Academy of Sciences.

Dr. Earl B. McKinley, Washington, is in the Orient conducting research on leprosy.

Dr. Harry S. Bernton, Washington, has been made Clinical Specialist in Allergy in the Bureau of Chemistry and Soils of the United States Department of Agriculture.

Dr. Alexander C. Leonardo, Washington, and Miss Alleen L. Bingham were married recently.

DEATHS

Dr. George W. Smith, Washington, aged 81, died October 8 of carcinoma of the bladder.

FLORIDA

The Duval County Medical Society has elected the following officers for the coming year: Dr. Kenneth A. Morris, Jacksonville, President; Dr. J. Lunsford Boone, Jacksonville, President-Elect; Dr. George Richardson, Jacksonville, Vice-President; Dr. George W. Croft, Jacksonville, Secretary; Dr. J. W. Hayes, Jacksonville, Treasurer.

The Florida East Coast Medical Association has elected the following officers for the coming year: Dr. Erasmus B. Hardee, Vero Beach, President; Dr. Frederick K. Herpel, West Palm Beach and Dr. Frederick J. Waas, Jacksonville, Vice-Presidents; Dr. Elbert McLaury, Hollywood, Secretary.

The Hillsborough County Medical Society has elected the following officers for the coming year: Dr. George L. Cook, Tampa, President; Dr. J. W. Alsobrook, Plant City, Vice-President; Dr. James S. Grable, Tampa, Secretary-Treasurer.

The St. Francis Hospital Staff, Miami Beach, has elected the following officers for the coming year: Dr. Nelson M. Black, President; Dr. D. Ward White, Vice-President; Dr. Paul K. Jenkins, Secretary.

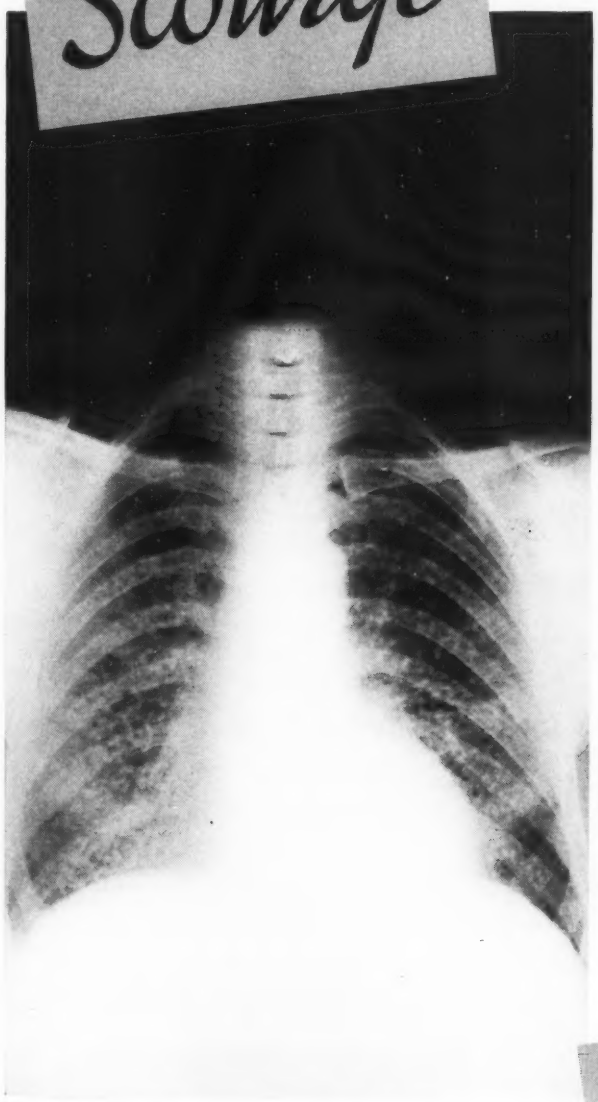
Dr. Carleton Deederer, Miami, has opened the Deederer Health Clinic.

Dr. C. C. Bottari, Tampa, has opened offices in the First National Bank Building.

Dr. M. P. Travers announces his removal to the Lincoln Medical Building, Miami Beach, and the Ingraham Building, Miami.

Continued on page 36

Scourge



PNEUMONOCONIOSIS may well be termed a scourge, for it is authoritatively stated that 75% of patients suffering from the silicosis type die of tuberculosis. And since tuberculosis may develop at any stage of the disease, it is in many cases rapidly fatal.

Considering the far-reaching medicolegal significance of this "greatest industrial hazard," early diagnosis and treatment can hardly be overemphasized . . . And of first importance is the x-ray examination, for around it the final diagnosis centers.

• • •

Radiographs will show the exact type or stage of the disease . . . will make possible prompt differential diagnosis as between pneumonoconiosis and other types of pulmonary affections. Periodic x-ray examination at frequent intervals will demonstrate the effect of control, or, in patients exposed to a dust hazard, the progress of the disease.

At the first suspicion of pneumonoconiosis, refer the patient to your radiologist. Let his resources and knowledge provide facts so necessary in therapy as well as medicolegal situations that may arise in such industrial cases.

Radiographs Provide Diagnostic Facts

EASTMAN KODAK COMPANY
Medical Division Rochester, N. Y.

Continued from page 34

Dr. Charles E. Boynton, Jr., West Palm Beach, has moved into the Comeau Building.

Dr. A. G. Holmes, formerly of Miami Beach, has moved to Daytona Beach.

Dr. J. H. Chiles, formerly of Orlando, has moved to Holopaw.

Dr. Herbert W. Bearce, formerly of Daytona Beach, has moved to Port Orange.

Dr. Harry S. Howell, formerly of Chattahoochee, has moved to Lake City.

Dr. Lauren McCall Sompayrac, Jacksonville, has returned after studying in London.

Dr. H. Bernard McEuen, Jacksonville, has moved into the St. James Building.

Dr. Edgar Watson, Lakeland, has been doing postgraduate work in Boston.

Dr. J. Ralph Vallotton, Daytona Beach, has returned after doing postgraduate work in Vienna.

Dr. M. A. Nickle, Clearwater, has returned after visiting hospitals in London.

Dr. L. L. Lancaster, formerly of Bartow, announces his association with Dr. W. T. Simpson, Winter Haven.

Dr. Edmund H. Teeter, Jacksonville, has been elected President of the Exchange Club of that city.

Dr. A. T. Eide, Lake Placid, has been elected Representative to the Legislature from Highlands County.

Dr. L. W. Glatzau and Mrs. Winnifred McDonald, both of Daytona Beach, were married November 12.

Dr. Charles Gordon Merrick, Fort Myers, and Mrs. Elizabeth Woolslair Page were married September 8.

Dr. Horace Asa Day, Orlando, and Miss Mary Elizabeth Schlater were married October 10.

Deaths

Dr. William H. Bohart, Vero Beach, aged 67, died November 14.

Dr. John Miller Beggs, Chattahooche, aged 47, died October 28 of carcinoma of the esophagus.

Dr. Francis Kennedy Armstrong, Fort Meyers, aged 68, died October 26.

Dr. Starke Hassell, Miami, aged 75, died October 6 of carcinoma of the prostate.

GEORGIA

The Colquitt County Medical Society has elected the following officers for the coming year: Dr. W. R. McGinty, Moultrie, President; Dr. W. L. Bennett, Moultrie, Vice-President; Dr. R. M. Joiner, Moultrie, Secretary-Treasurer.

The Georgia Urological Association has elected the following officers for the coming year: Dr. J. C. Keaton, Albany, President; Dr. Earl Floyd, Atlanta, President-Elect; Dr. W. E. Upchurch, Atlanta, Secretary-Treasurer.

The Hall County Medical Society has elected the following officers for the coming year: Dr. H. H. Lancaster, Clermont, President; Dr. B. B. Davis, Gainesville, Vice-President; Dr. Hartwell Joiner, Gainesville, Secretary-Treasurer.

The Macon Medical Society has elected the following officers for the coming year: Dr. W. L. Bazemore, Macon, President; Dr. W. R. Golsan, Macon, President-Elect; Dr. H. C. Atkinson, Macon, Vice-President; Dr. W. Chas. Boswell, Macon, Secretary-Treasurer.

The Spalding County Medical Society has elected the following officers for the coming year: Dr. George L. Walker, Griffin, President; Dr. D. L. Head, Zebulon, Vice-President; Dr. H. J. Copeland, Griffin, Secretary-Treasurer.

The Taliaferro County Medical Society has elected the following officers for the coming year: Dr. T. C. Nash, Philomath, President; Dr. John A. Rhodes, Crawfordville, Secretary-Treasurer.

The Tri County Medical Society has elected the following officers for the coming year: Dr. R. R. Bridges, Leary, President; Dr. J. S. Beard, Edison, Vice-President; Dr. J. G. Standifer, Blakely, Secretary-Treasurer.

Dr. Lewis H. Oden, Jr., Blackshear, was recently made physician for Pierce County.

Dr. James J. Clark, Atlanta, has been made President of the Medical Staff of Emory University Hospital.

Dr. John W. Oden, Milledgeville, has been made Superintendent of the Milledgeville State Hospital.

Dr. Bruce Threatte, Columbus, Dr. W. L. Pomeroy, Waycross,

Continued on page 38

"Buffered"

ALKALINIZATION

The physician encounters a tendency toward a lowered alkali reserve in many of the clinical and sub-clinical involvements of the Winter season.

In such conditions it is possible to restore the patient to a normal pH and then maintain it by the administration of Kalak.

The high buffering power of Kalak allows it to neutralize acids but the new salts produced still make for no change in the pH.

KALAK WATER COMPANY OF NEW YORK, Inc.
6 CHURCH STREET
NEW YORK CITY

Kalak
TRADE MARK REG. U.S. PAT. OFF.

FOR RESPIRATORY DISORDERS

A tonic preparation of recognized usefulness attested by definite clinical results

LIQUID PEPTONOIDS WITH CREOSOTE is indicated as an effective therapeutic aid in the treatment of colds, bronchitis, influenza and other respiratory infections.

It supplies immediately available nutriment, promotes expectoration, and reduces irritation of the respiratory passages.

It is so blended as to mask the taste of the creosote, thus permitting continued creosote medication.

A request for PC #4 will bring you samples and further information

FORMULA

Each tablespoonful represents:

Pure Beechwood Creosote	2 min.
Guaiacol	1 min.
Proteins (peptones and propeptones)	5.25%
Lactose and Dextrose	11.3%
Cane sugar	2.5%
Mineral constituents (ash)	0.95%
Alcohol (by volume)	12.0%

THE
Arlington
CHEMICAL COMPANY
Yonkers, N. Y.

Continued from page 36

and Dr. H. A. Seaman, Waycross, have been made Fellows in the American College of Surgeons.

Dr. H. G. Huey, Homerville, has been appointed to the State Board of Medical Examiners for a term of four years.

Dr. James E. Paul'in, Atlanta, has been made President of the American Clinical and Climatological Association.

Dr. William J. Hudson has moved from Augusta to Covington.

Dr. B. T. Beasley, Atlanta, has moved into the Hurt Building.

Dr. W. P. Smith, Jr., formerly of Emory University Hospital, has opened offices on Church Street in Decatur.

Dr. Harry T. Harper, Jr., formerly of Augusta, has moved to Eastman.

Dr. Kirk Shepard, Atlanta, has opened offices in the Doctors Building.

Dr. N. B. Batem n and Dr. Samuel Y. Brown, Atlanta, announce their Association for the practice of medicine and surgery.

Dr. A. B. Daniel, form rly of Savannah, has moved to Claxton where he will be associated with his father, Dr. J. Wallace Daniel.

Dr. Fredric R. Minnich, Atlanta, has moved into the Doctors Building.

Dr. H. L. Tippins, Baxley, has returned after doing postgraduate work in Chicago.

Dr. R. P. Morrown, West Point, is doing postgraduate work in New Orleans.

Dr. H. C. Atkinson, Macon, has returned after doing postgraduate work in Philadelphia.

Dr. Arnold Peel Mulkey, Millen, and Miss Victoria Davis were married recently.

Dr. Dewey Thurman Nabors and Miss Ida Susannah Thomas, both of Atlanta, were married October 10.

Deaths

Dr. Nathaniel Hooks Lozier, Sandersville, aged 46, died October 21 of streptococcic infection.

Dr. Frank Lee Cato, Leslie, aged 73, died October 23 of chronic nephritis and diabetes mellitus.

Dr. Willis Wade Rutland, LaGrange, aged 73, died October 24 of pyelonephritis and hypertrophic prostatitis.

Dr. Robert L. McMichael, Buena Vista, aged 65, died October 1.

Dr. William Washington Liles, Gainesville, aged 61, died November 6.

Dr. Harvey W. Smith, Atlanta, aged 72, died November 8 of heart disease.

Dr. Lonie W. Hodges, Gainesville, aged 60, died recently of coronary thrombosis.

Dr. Jarrell N. Hogg, Macon, aged 83, died September 28.

Dr. J. Beal Powers, Macon, aged 74, died recently.

Dr. Lee L. Robinson, Boston, aged 64, died November 5.

KENTUCKY

Dr. A. T. McCormack, Louisville, has been elected President of the American Public Health Association.

The Boyd County Medical Society has elected the following officers for the coming year: Dr. H. E. Martin, LaFayette, President; Dr. M. D. Garred, Ashland, Vice-President; Dr. C. B. Daniels, Ashland, Secretary; Dr. H. S. Swope, Ashland, Treasurer.

The Carlis'e County Medical Society has elected the following officers for the coming year: Dr. J. F. Harrell, Bardwell, President; Dr. R. C. Burrow, Cunningham, Vice-President; Dr. J. F. Dunn, Arlington, Secretary-Treasurer.

Deaths

Dr. Gipson W. Stagner, Richmond, aged 75, died October 31 of uremia.

Dr. William F. Beverly, Nicholasville, aged 77, died October 2 of acute colitis and pulmonary emphysema.

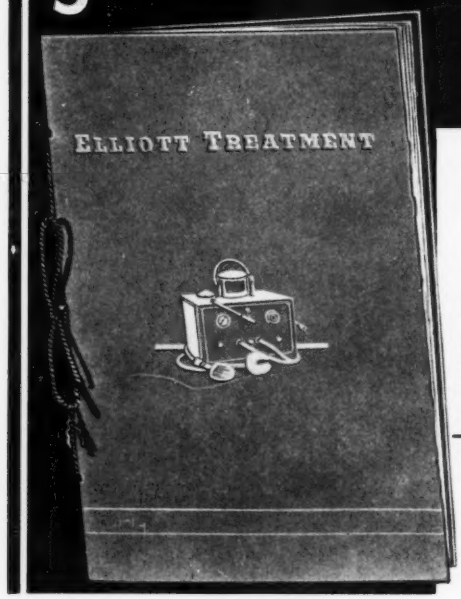
Dr. William B. Radford, Hopkinsville, aged 74, died September 17 of organic heart disease.

LOUISIANA

The Orleans Parish Medical Society has elected the following officers for the coming year: Dr. James T. Nix, President; Dr. Shirley C. Lyons, First Vice-President; Dr. George H. Hauser,

Continued on page 40

Send for this Complete Handbook on—



ELLIOTT TREATMENT

Internal Heat Therapy at 130° F.
For Acute or Chronic Inflammatory Conditions Of the Male and Female Pelvis

A M A — Council Accepted
Approved by Am. College of Surgeons

This comprehensive handbook should be in the reference files of every physician. It answers fully the questions: What is Elliott Treatment? . . . How is it administered? . . . Where is it being used? . . . What are the recorded findings of competent observers? Catalogue contains excerpts from authoritative articles which have appeared in various medical journals on the use of Elliott Treatment in a wide variety of pelvic inflammations. By filling out and mailing the attached coupon your copy will go forward to you immediately.

TREATMENT REGULATOR CORPORATION
11-211 General Motors Building, Detroit, Michigan

Gentlemen: — Without obligation, please send me at once your handbook on Elliott Treatment.

NAME _____

ADDRESS _____

CITY _____ STATE _____

FOR HER BABY, RECOMMEND STRAINED FOODS BEARING—

1. A SEAL YOU VALUE HIGHLY

2. (57) A SEAL SHE UNDERSTANDS

Every day, an increasing number of doctors give their active recommendation to Heinz Strained Foods for infants and soft diet cases.

One reason is that Heinz Strained Foods bear the Seal of Acceptance of the American Medical Association's Council on Foods. This means that they have been carefully investigated and officially accepted by your exacting profession.

Secondly, Heinz Strained Foods bear the famous "57" Seal of Quality. For over 50 years women have looked to this insignia as a hallmark of pure, safe and wholesome foods. They have never been disappointed.

Recommend strained foods that have *both* the backing of your official body and the high esteem of experienced housewives and mothers throughout America. Suggest *Heinz!*

HEINZ STRAINED FOODS

11 KINDS—1. Strained Vegetable Soup. 2. Mixed Greens. 3. Spinach. 4. Carrots. 5. Beets. 6. Peas. 7. Prunes. 8. Cereal. 9. Apricots and Apple Sauce. 10. Tomatoes. 11. Green Beans.

Continued from page 38

Second Vice-President; Dr. Edgar Burns, Third Vice-President; Dr. Gilbert C. Anderson, Secretary; Dr. Edwin H. Lawson, Treasurer.

The Avoyelles Parish Medical Society has elected the following officers for the coming year: Dr. Albert M. Abramson, Marksville, President; Dr. Adrian B. Cairns, Bunkie, Vice-President; Dr. Kirby A. Roy, Mansura, Secretary-Treasurer.

The Claiborne Parish Medical Society has elected the following officers for the coming year: Dr. C. O. Wolff, Haynesville, President; Dr. E. B. Middleton, Homer, Vice-President; Dr. H. R. Marlatt, Homer, Secretary-Treasurer.

The DeSoto Parish Medical Society has elected the following officers for the coming year: Dr. B. P. Smith, Keatchie, President; Dr. F. O. Brinkley, Gloster, Vice-President; Dr. W. G. Jones, Mansfield, Secretary-Treasurer.

The East and West Feliciana Bi-Parish Medical Society has elected the following officers for the coming year: Dr. S. L. Shaw, Clinton, President; Dr. W. J. Robards, Vice-President; Dr. E. M. Toler, Clinton, Secretary-Treasurer.

The East Baton Rouge Medical Society has elected the following officers for the coming year: Dr. William K. Irwin, Baton Rouge, President; Dr. Ashto Robins, Baton Rouge, First Vice-President; Dr. T. L. Mills, Zachary, Second Vice-President; Dr. J. L. Bevens, Baton Rouge, Secretary-Treasurer.

The Shreveport Medical Society has elected the following officers for the coming year: Dr. W. B. Heidorn, President; Dr. R. T. Lucas, First Vice-President; Dr. W. J. Sandidge, Second Vice-President; Dr. P. D. Abramson, Secretary; Dr. D. R. McIntyre, Treasurer.

The Iberia Parish Medical Society has elected the following officers for the coming year: Dr. H. A. King, Jr., New Iberia, President; Dr. W. P. Tilly, New Iberia, Vice-President; Dr. B. L. Stinson, New Iberia; Secretary-Treasurer.

The Pointe Coupee Parish Medical Society has elected the following officers for the coming year: Dr. F. F. Rougon, New Roads, President; Dr. John S. Branch, Lettsworth, Vice-President; Dr. Eugene G. Durel, New Roads, Secretary-Treasurer.

The Sabine Parish Medical Society has elected the following officers for the coming year: Dr. W. D. Lester, Many, President; Dr. J. W. Craig, Many, Vice-President; Dr. W. G. Allen, Converse, Secretary-Treasurer.

The Tri-Parish Medical Society has elected the following officers for the coming year: Dr. J. Preston Davis, Lake Providence, President; Dr. B. C. Abernathy, Sondheimer, Dr. E. D. Butler, Oak Grove, Dr. E. O. Edgerton, Tallulah and Dr. D. F. Davis, Newellton, Vice-Presidents; Dr. William H. Hamley, Lake Providence, Secretary-Treasurer.

The Webster Parish Medical Society has elected the following officers for the coming year: Dr. R. E. Smith, Minden, President; Dr. C. M. Baker, Minden, Vice-President; Dr. B. A. Norman, Minden, Secretary-Treasurer.

Dr. Walter J. Otis, New Orleans, has been made Physician-in-Chief to the DePaul Sanitarium.

Dr. John W. Jolley, formerly of St. Louis, Missouri, has moved to New Orleans.

Dr. Julian Graubarth, New Orleans, has been appointed Physician in-Chief to the Jewish Children's Home and the Isidor Newman School, succeeding Dr. L. R. DeBuys, resigned.

Deaths

Dr. William P. Miles, Jr., New Orleans, aged 69, died October 4 of cerebral thrombosis and arteriosclerosis.

MARYLAND

Dr. Arthur M. Shipley, Baltimore, has assumed the Presidency of the Medical and Chirurgical Faculty of the State of Maryland, having been elected at the annual meeting last April. Other officers elected were Dr. Harvey B. Stone, Baltimore, Dr. W. A. Gracie, Cumberland, and Dr. R. Lee Hall, Pocomoke City, Vice-Presidents; Dr. Walter D. Wise, Baltimore, Secretary; Dr. J. Albert Chatard, Baltimore, Treasurer.

The Baltimore City Medical Society has elected the following officers for the coming year: Dr. Robert P. Bay, President; Dr. Charles R. Austrian, Vice-President; Dr. Frank J. Geraghty, Secretary; Dr. J. Albert Chatard, Treasurer.

In honor of the twentieth anniversary of Dr. J. M. H. Row-

Continued on page 42

BETTER THAN EVER!
KOMPAK MODEL
New Features
COMPLETE NEW DRESS—INSIDE AND OUT
Hard wear-resisting finish—opalescent gray, black and silver
TUBE MOUNTING CARELESSNESS-PROOF
Practically defies glass breakage. Facilitates exact reading
BEAUTIFUL MODERN SCALE
Platinum-like debossed numbers on black alumilited metal
SOLID ONE-PIECE DIE-CAST DURALUMIN
Light as aluminum—strong as steel.
AND MANY OTHER NEW FEATURES . . .
ALL THE EXCLUSIVE FEATURES THAT HAVE MADE THE BAUMANOMETER "STANDARD FOR BLOODPRESSURE THE WORLD OVER"
Lifetime
Baumanometer
STANDARD FOR BLOODPRESSURE
29.50
See Your Surgical Instrument Dealer
W. A. BAUM CO. INC. NEW YORK
SINCE 1916 ORIGINATORS AND MAKERS OF BLOODPRESSURE APPARATUS EXCLUSIVELY

The Problem . . .

To Change a Constipated Stool to a Normal Stool Without Harmful Catharsis

AXIOM—A good drainage (normal) stool = constipated stool + 70% water*

ARGUMENT—1. Constipated stools lack 70% water
2. Mucilose takes up 80% volumes water

SOLUTION—Constipated stool + (Mucilose + Water)** = good drainage (normal) stool

Q. E. D.—*Constipation corrected*

MUCILOSE

is a hemicellulose (vegetable gum) prepared by a special process from the Plantago loeflingii.

*Oelgoetz, A. W., Oelgoetz, P. A. and Wittekind, J., Am. J. of Dig. Dis. & Nutr., Vol. 3, p. 549, Oct. 1936.

**Ingested water and *not* water withdrawn from intestinal mucosa.

FREDERICK STEARNS & COMPANY

DETROIT NEW YORK KANSAS CITY SAN FRANCISCO
WINDSOR, ONTARIO SYDNEY, AUSTRALIA

FREDERICK STEARNS & COMPANY Dept. S. M. 2
Detroit, Michigan
Please send me a supply of Mucilose for clinical test.

Dr......

Address.....

City..... *State*.....

Continued from page 40

land as Dean of the University of Maryland School of Medicine, December 18 was observed as "Rowland Day." There were formal exercises at Peabody Hall at which time a portrait of Dr. Rowland, painted by Mr. Thomas Corner, was presented to the University by the Alumni Association of the Medical School. Clinics were held in the Gordon Wilson Hall during the afternoon and a Testimonial Dinner was given that evening. Following the speakers at the dinner a bust of Dr. Rowland, done by his daughter, Mrs. Carl Clarke, was presented to the Medical School.

The Frederick County Medical Society has elected the following officers for the coming year: Dr. Frank Worthington, Frederick, President; Dr. John Messler, Johnsville, First Vice-President; Dr. R. W. Baer, Frederick, Second Vice-President; Dr. Lawrence Fahrney, Frederick, Secretary; Dr. William C. Johnson, Frederick, Treasurer.

The Talbot County Medical Society has elected the following officers for the coming year: Dr. W. T. Hammond, Easton, President; Dr. J. B. Merritt, Easton, First Vice-President; Dr. W. N. Palmer, Easton, Second Vice-President; Dr. J. A. Ross, Trappe, Secretary-Treasurer.

The Washington County Medical Society has elected the following officers for the coming year: Dr. C. L. Mowrer, Hagerstown, President; Dr. R. A. Bell, Hagerstown, Vice-President; Dr. E. F. Poole, Hagerstown, Secretary-Treasurer.

Dr. William E. Woodall, Chief Disinfector, Baltimore City Health Department, recently resigned.

Dr. Elmer V. McCollum, Baltimore, has been made a member of the U.S.P. Vitamin Advisory Board.

Dr. James A. Fields, formerly of Mare Island, California, has moved to Indian Head.

Dr. James H. Bunn, Baltimore, and Miss Frances Middleton, were married November 26.

Dr. James Fortin Minnes and Miss Margaret Whitehead, both of Baltimore, were married October 3.

Deaths

Dr. George Logan Hall, Baltimore, aged 51, died October 31 of aortic insufficiency.

Oxygen Says:

"During the past few years I have become an increasingly important factor to the Medical Profession. I am now being used pre-operatively, post-operatively, in pneumonia, asthma, chronic heart conditions, etc. BUT, to do my best work therapeutically, I must be administered immediately following diagnosis, and continued until I have completed my task."

"Puritan Maid"
Cyclopropane
Nitrous Oxid
Ethylene
Oxygen
Carbon Dioxid
Percentage Mixtures of Carbon Dioxid and Oxygen

One of the most effective means for the administration of Oxygen in prolonged cases is the Nasal Catheter method—used and recommended by Doctors who have made a study of the value of Oxygen therapy.

Our PURITAN NASAL CATHETER OUTFIT, as shown, is efficient, economical, portable, and durable. We have installed this equipment in many of the leading hospitals over the entire country. We call your particular attention to the pressure-reducing regulator with which this unit is equipped, which is of the highest quality. A high-pressure gauge shows contents of cylinder, and an accurate working-pressure gauge registers flow in litres per minute, with positive control.

Puritan Nasal Catheter Outfits - Leading Makes of Oxygen Tents - Bedside Inhalation Units. For Sale or Rental at All of Our Locations.

All Types of Anesthetic Gas Machines, Resuscitators and Inhalators - Wilson Soda Lime.

Puritan Compressed Gas Corp.

CINCINNATI ST. LOUIS ST. PAUL DETROIT
KANSAS CITY CHICAGO CAMBRIDGE BALTIMORE

Dr. Charles Metcalfe Byrnes, Baltimore, aged 55, died November 29.

Dr. William B. Wolf, Baltimore, aged 67, died November 1.

MISSISSIPPI

The Clarksdale and Six Counties Medical Society has elected the following officers for the coming year: Dr. J. E. Powell, Charleston, President; Dr. L. B. Austin, Rosedale, Dr. E. LeRoy Wilkins, Clarksdale, Dr. Fred Stone, Sledge, Dr. T. F. Clay, Tutwiler, and Dr. W. H. Williams, Tunica, Vice-Presidents; Dr. N. C. Knight, Clarksdale, Secretary.

The Northeast Mississippi Hospital Staff has elected the following officers for the coming year: Dr. R. H. Christian, Baldwyn, President; Dr. H. B. Sutherland, Booneville, Vice-President; Dr. L. L. McDougal, Sr., Booneville, Secretary-Treasurer.

Dr. A. V. Beacham has opened offices in Magnolia.

Dr. Rowland W. Hall, Jackson, announces his association with Dr. James Grant Thompson for the practice of dermatology and syphilology.

Dr. Cecil Rhodes Walley, Jackson, announces his association with his father, Dr. Willis Walley.

Dr. C. N. D. Campbell, formerly of Sumrall, has moved to Greenwood.

Dr. Lawrence W. Long, Jackson, has been elected President of the Central Medical Society.

Dr. Robert B. Cunningham, Booneville, has been made a Fellow of the American College of Surgeons.

Dr. James M. Campbell and Miss Lucile Box, both of Newton, were married recently.

Dr. Gus A. Rush, Jr., Meridian, and Miss Helen Virginia Arline were married January 11.

Deaths

Dr. John Fleming Chamberlain, Natchez, aged 59, died October 26 of coronary thrombosis.

MISSOURI

The Adair-Knox-Schuyler-Sullivan County Medical Society has elected the following officers for the coming year: Dr. S. L. Freeman, Kirksville, President; Dr. F. E. Luman, Edina, Vice-President; Dr. J. S. Gashwiler, Novinger, Secretary.

The Atchison County Medical Society has elected the following officers for the coming year: Dr. James A. Gray, Watson, President; Dr. William R. Strickland, Rockport, Secretary.

The Chariton County Medical Society has elected the following officers for the coming year: Dr. W. B. Lucas, Mendon, President; Dr. F. L. Harms, Salisbury, Vice-President; Dr. G. W. Hawkins, Salisbury, Secretary-Treasurer.

The Saline County Medical Society has elected the following officers for the coming year: Dr. R. W. Kennedy, Marshall, President; Dr. S. T. Mead, Slater, Vice-President; Dr. E. A. Belden, Marshall, Secretary-Treasurer.

The South Central Counties Medical Society has elected the following officers for the coming year: Dr. J. C. B. Davis, Willow Springs, President; Dr. R. A. Ryan, Mountain Grove, Vice-President; Dr. A. C. Ames, Mountain Grove, Secretary-Treasurer.

The Ste. Genevieve County Medical Society has elected the following officers for the coming year: Dr. J. A. Wilkens, St. Marys, President; Dr. G. M. Rutledge, Ste. Genevieve, Vice-President; Dr. Robert W. Lanning, Ste. Genevieve, Secretary-Treasurer.

The Kansas City Anatomical Society has elected the following officers for the coming year: Dr. William Byron Black, Kansas City, President; Dr. Albert N. B. Lemoine, Kansas City, and Dr. Lyman Robert Forgrave, St. Joseph, Vice-Presidents; Dr. Willis E. Keith, Kansas City, Secretary; Dr. Oliver S. Gilliland, Kansas City, Treasurer.

Dr. Edwin C. Ernst, St. Louis, was recently presented with a gold medal by the Radiological Society at the meeting in Cincinnati for his research in the treatment of cancer and in measuring units of the roentgen ray.

Deaths

Dr. John Walter Hardy, Jr., Joplin, aged 33, died November 8 of injuries received in an automobile accident.

Dr. Leslie Allen Wilson, Cameron, aged 45, died recently of heart disease.

Dr. Henry R. Riemer, St. Joseph, aged 90, died October 29 of arteriosclerosis.

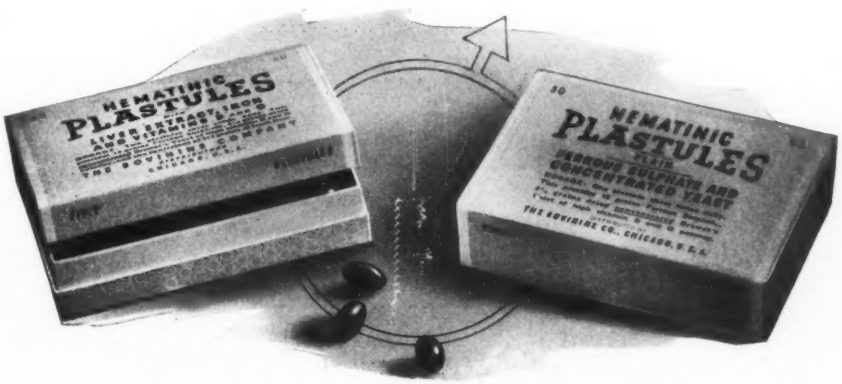
Dr. Abner Jackson Mynatt, Lamar, aged 67, died October 14 of heart disease.

Continued on page 44

IRON

THE therapeutic value of iron is directly proportional to the ease with which ferrous ions are liberated. Recent experiments have shown the ferrous salts to be the most effective in the treatment of anemias because they are more rapidly assimilated, require smaller doses and are more economical than other forms of iron now in use. An effective form of ferrous iron is available in Hematinic Plastules. . . . Actual tests reveal that the absorption of ferrous sulphate in Hematinic Plastules is four to five times greater than that of ferric ammonium citrate, 15 times greater than that of reduced iron, and is more readily adaptable to metabolism in the human body. Three Hematinic Plastules Plain provide the average patient with an adequate daily dose of iron to show a marked increase in hemoglobin. . . . Hematinic Plastules provide ferrous sulphate and vitamins B and G in an edible oil in the form of a semi-fluid mass, enclosed in soluble gelatin capsules which quickly dissolve in the stomach. . . . Hematinic Plastules are available in two types—Plain and with Liver Extract.

Send for Samples and Literature



THE BOVININE COMPANY • CHICAGO, ILLINOIS

DOCTOR—If you were in attendance at the Baltimore meeting of the Southern Medical Association last November and had the misfortune to lose something, please read over the following list of personal articles found in meeting rooms yet uncalled for:

2 pairs of glasses
2 pairs of gloves
3 scarfs
2 sets of keys

Please address all inquiries to the Southern Medical Association, 1020 Empire Building, Birmingham, Alabama.

Continued from page 42

Dr. John E. Westaver, St. Louis, aged 84, died October 10 of general debility.

Dr. Theodore W. A. Blank, St. Louis, aged 73, died October 6 of heart disease.

Dr. Edward B. Gossett, Kansas City, aged 71, died October 16 of pulmonary embolism and bacillary dysentery.

Dr. Lenzy E. McClure, Walnut Grove, aged 64, died October 11 of cerebral hemorrhage.

Dr. John D. Dunham, Pattonburg, aged 81, died October 6.

Dr. Jacob Jacobson, St. Louis, aged 67, died October 31 of heart disease.

NORTH CAROLINA

The Fifth District Medical Society has elected the following officers for the coming year: Dr. James G. Pate, Gibson, President; Dr. O. L. McFadyen, Fayetteville, Secretary-Treasurer.

The Guilford County Medical Society has elected the following officers for the coming year: Dr. P. W. Flagge, High Point, President; Dr. W. L. Jackson, High Point, Vice-President; Dr. E. T. Harrison, High Point, Secretary; Dr. Philip B. Davis, High Point, Treasurer.

The Rowan County Medical Society has elected the following officers for the coming year: Dr. J. C. Eagle, Spencer, President; Dr. W. L. Tatum, Salisbury, Vice-President; Dr. B. W. McKenzie, Salisbury, Secretary; Dr. I. E. Shafer, Salisbury, Treasurer.

Dr. John Donnelly, Huntersville, has been elected President of the Southern Sanatorium Association.

Dr. Bennie B. Dalton, Rockingham, has resigned as Health Officer of Richmond County.

Dr. John McCampbell, Morganton, has been made a member of the State Eugenics Board to succeed Dr. W. Clinton Linville, Goldsboro.

Dr. David Pollack, formerly of Colorado Springs, Colorado, has moved to Hobgood.

Dr. Herbert Potts, Goldsboro, and Miss Sophia Hargett were married November 7.

Dr. John McKamie Harry, Concord, and Miss Sarah Katherine Currie were married November 7.

Dr. Ralph Bernard Garrison, Glen Alpine, and Miss Evelyn Louise Blackley were married November 14.

Dr. Robert Boone Outland, Elm City, and Miss Lois Griswold were married November 5.

Dr. Edward Lee Gilbert and Miss Ernestine Flynt, both of Winston-Salem, were married recently.

Dr. Glen Grey Perry and Miss Agnes Adelaide Williamson, both of High Point, were married in October.

Dr. William Thomas Clary and Mrs. Polly Gordon Bledsoe, both of Greensboro, were married recently.

DEATHS

Dr. Robert William Petrie, Murphy, aged 60, died November 17 of acute myocarditis.

Dr. Francis Marion Davis, Greenville, aged 32, died November 15 from injuries received in an automobile accident.

Dr. G. D. McGregor, Charlotte, aged 37, died December 9 from injuries sustained from a fall from his window.

OKLAHOMA

The Oklahoma City Clinical Conference held its annual meeting October 26-29.

Dr. V. M. Rutherford, Woodward, has been made Health Superintendent of Woodward County.

Deaths

Dr. Vance Gist, Frederick, aged 82, died recently of cerebral hemorrhage.

Dr. Theodore Tillman Shackelford, Haskell, aged 50, died October 18.

Dr. Alonzo L. Share, Oklahoma City, aged 72, died October 6 of cerebral hemorrhage.

Dr. A. J. Weedn, Duncan, aged 62, died November 15 of a heart attack.

Dr. Gaines Brightwell, Leedy, aged 30, died November 22.

SOUTH CAROLINA

The Fifth District Medical Association has elected the following officers for the coming year: Dr. C. P. Ryan, Ridgeland, President; Dr. Riddick Ackerman, Walterboro, Vice-President; Dr. John van de Erve, Jr., Charleston, Secretary-Treasurer.

Dr. Rudolph Farmer, State Park, and Miss Bernice Turner were married recently.

Dr. Thomas Lawman Lucas and Miss Jane Hill Agnew, both of Charleston, were married August 31.

DEATHS

Dr. H. Manning Brabham, Ehrhardt, aged 70, died November 19 from injuries received in a fall.

Dr. James Avery Finger, Charleston, aged 53, died November 23.

TENNESSEE

The Anderson County Medical Society has elected the following officers for the coming year: Dr. H. D. Hicks, Clinton, President; Dr. J. Sam Taylor, Clinton, Vice-President; Dr. James Hall, Clinton, Secretary-Treasurer; Dr. W. B. Barton, Briceville, Corresponding Secretary.

The Dyer, Lake and Crockett Counties Medical Society has elected the following officers for the coming year: Dr. J. P. Baird, Dyersburg, President; Dr. B. G. Marr, Dyersburg, Dr. W. L. Summers, Ridgely, Dr. J. O. McKinney, Friendship, Vice-Presidents; Dr. C. L. Denton, Dyersburg, Secretary-Treasurer.

The Greene County Medical Society has elected the following officers for the coming year: Dr. W. T. Mathes, Greeneville, President; Dr. M. A. Blanton, Mosheim, Vice-President; Dr. I. E. Phillips, Greeneville, Secretary-Treasurer.

The Hardin, Lawrence, Lewis, Perry and Wayne Counties Medical Society has elected the following officers for the coming year: Dr. Otis Whitlow, Savannah, President; Dr. J. V. Hughes, Savannah, Dr. V. H. Crowder, Lawrenceburg, Dr. Paul Wylie, Hohenwald, Dr. J. W. Frost, Linden, and Dr. J. T. Keeton, Clifton, Vice-Presidents; Dr. O. H. Williams, Savannah, Secretary-Treasurer.

The Robertson County Medical Society has elected the following officers for the coming year: Dr. E. W. Adair, Springfield, President; Dr. W. P. Stone, Springfield, Vice-President; Dr. J. E. Wilkison, Springfield, Secretary-Treasurer.

DEATHS

Dr. Edwin A. Long, Johnson City, aged 74, died October 27 of myocarditis.

Dr. Joseph B. Cassell, Harriman, aged 63, died recently.

Dr. James Logan McMillan, Decaturville, aged 51, died October 27.

Dr. Herschel Ezell, Nashville, aged 48, died November 26.

TEXAS

The Texas Association of Obstetricians and Gynecologists has elected the following officers for the coming year: Dr. Herman W. Johnson, Houston, President; Dr. W. L. Parker, Wichita Falls, President-Elect; Dr. J. W. Bourland, Dallas, Vice-President; Dr. Minnie L. Maffett, Dallas, Secretary-Treasurer.

The Providence Sanatorium Staff, Waco, has elected the fol-

Continued on page 46

Classified Advertisements

ASSISTANCE OFFERED TO MEDICAL WRITERS. Research. Abstracts. Translations (all languages). Papers prepared from author's data. Ten years' experience with leading physicians and appointments on medical journals of highest standing. I employ no assistants; all my work is done personally and is reliable. Florence Annan Carpenter, 1801 Sixteenth St., N. W., Washington, D. C.

"IT'S NOT THE OIL . . it's the *Vitamins*"

● Cod liver oil was used for many years before the discovery that the therapeutic activity rested in the fat-soluble vitamins A and D rather than the oil itself.

You may now prescribe the natural vitamin potency of cod liver oil, stripped of the unpleasant oily bulk, in a compact, palatable form—White's Cod Liver Oil Concentrate.

When you prescribe White's Cod Liver Oil Concentrate, you are not *substituting*—you are providing the natural vitamin potency of cod liver oil devoid of the disagreeable "excess baggage."

Assuring Obedient Patients

When long continued administration of a medicament is desired, full cooperation of the patient is necessary. Any factor which will increase palatability and convenience will also aid in assuring routine administration. Particularly is this true for the following patient types:

The Infant—in whom the fear of the teaspoon has been instilled by parents.

The Child—who rebels at the unpalatable fatty bulk of cod liver oil.

The Convalescent—whose appetite is disturbed by bulky and unpleasant medication.

The Pregnant Mother—who needs the cod liver oil vitamins but cannot tolerate the oily or fatty portion of cod liver oil.

Patients of all ages will gladly accept the three economical, pleasant dosage forms of White's Cod Liver Oil Concentrate.

WHITE LABORATORIES, Inc.
113 North 13th Street, Newark, N. J.

ACCEPTED AMERICAN MEDICAL ASSN.

White's

COD LIVER OIL CONCENTRATE

LIQUID TABLETS CAPSULES

Continued from page 44

lowing officers for the coming year: Dr. R. W. Crosthwait, President; Dr. D. D. Warren, Vice-President; Dr. Maurice Barnes, Secretary.

The Texas Public Health Association has elected the following officers for the coming year: Dr. E. W. Protho, Sweetwater, President; Dr. Harry Benge Crozier, Austin, Secretary-Treasurer.

Dr. McIver Furman, Corpus Christi, has been made President of the Spohn Hospital Staff.

Dr. H. L. D. Kirkham, Houston, has been made Vice-President of the American Association of Oral and Plastic Surgeons.

The International Post Graduate Medical Assembly met in San Antonio, January 26-28.

Dr. Y. F. Hopkins, Taylor, has returned after doing postgraduate work in Rochester, Minnesota.

Dr. J. C. Erwin, Jr., McKinney, has been doing postgraduate work in New Orleans.

Dr. W. I. Southerland, Leonard, is doing postgraduate work in New York City.

Dr. Herbert C. Maxwell, Lubbock, has been doing postgraduate work in Rochester, Minnesota.

Dr. Harold Lindley, Pecos, has returned after doing postgraduate work in Rochester, Minnesota.

Dr. W. C. Foster, Handley, has been made a Director of the First National Bank of that city.

Dr. J. J. Crume and Dr. Don S. Marsalis, Amarillo, have returned after doing postgraduate work in the East.

Dr. Charles Oliver Moody has moved from Santa Anna to Coleman.

Dr. E. O. Boggs has moved from New Gulf to Spring.

Dr. C. M. Covington has moved from Alto to Austin.

Dr. Harry T. Davidson has moved from Dallas to Longview.

Dr. Albert R. Delaney has moved from Livingston to Grand Canyon, Arizona.

Dr. M. A. Estep has moved from Cooper to Lufkin.

Dr. Robert Hargrave has moved from Corpus Christi to Wichita Falls.

Dr. John M. Hooper has moved from Denton to Fort Worth.

Dr. Jack Perry has moved from Austin to Terrell.

Dr. John J. Sloan has moved from Wichita Falls to Corpus Christi.

Dr. A. L. W. Tackaberry has moved from Shepherd to Jasper.

Dr. Paul A. Woodward has moved from Galveston to Bryan.

Dr. J. W. Youngblood has moved from Breckenridge to Stamford.

Dr. William E. Lockhart, Jr., Canyon, and Miss Lora Bell Kunze were married recently.

Deaths

Dr. John Irvin Gossett, Rule, aged 61, died October 24 of coronary thrombosis.

Dr. E. W. Robberson, Gainesville, aged 85, died recently.

Dr. Joseph Henry Witt, Waco, aged 80, died October 27 of senility.

Dr. Frederick William Hander, Beaumont, aged 63, died October 14.

Dr. Joel Hasty Massie, Dallas, aged 48, died recently of auricular fibrillation.

Dr. Howard Leonard Reed, Henrietta, aged 52, died October 23 of pneumonia.

Dr. Gustavus Adolphus Spivey, Dallas, aged 85, died October 24 of senility.

Dr. W. E. Fowler, Huntsville, aged 71, died recently of coronary thrombosis.

Dr. Joe Nance Parke, Kyle, aged 47, died September 19.

Dr. Wilson Adrian Latimer, Uvalde, aged 38, died September 24 of pneumonia.

VIRGINIA

The Louisa County Medical Society has elected the following officers for the coming year: Dr. H. S. Daniel, Louisa, President; Dr. H. G. Byrd, Louisa, Secretary-Treasurer.

The Medical Society of Nothern Virginia has elected the following officers for the coming year: Dr. George H. Smith, Winchester, President; Dr. Harold Miller, Woodstock, Vice-President; Dr. J. E. Harris, Winchester, Secretary-Treasurer.

Continued on page 48

AMENORRHEA

SCANTY MENSTRUATION

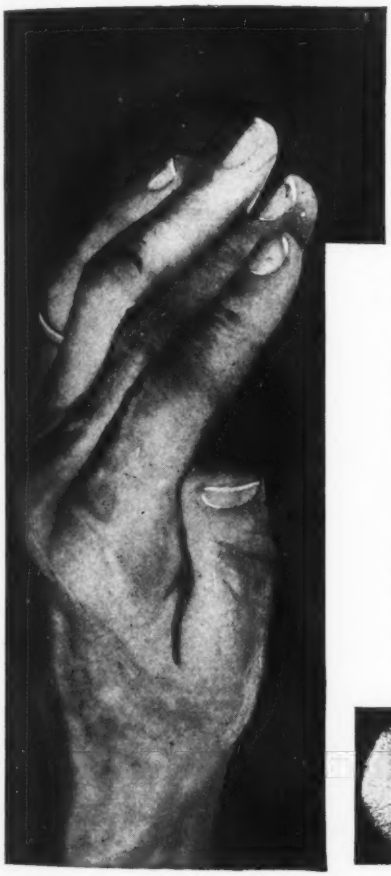
When menstruation fails to appear or is scanty and irregular and associated with low metabolism, obesity or hypothyroidism, prescribe

BOXES OF 100 TABLETS

G. W. CARNRICK CO.

20 Mt. Pleasant Avenue Newark, New Jersey

Important study proves effectiveness of this colloidal sulfur for chronic arthritis



SULISOCOL

COLLOIDAL SULFUR ISOTONIC

Trade Mark Reg. U. S. Pat. Off. U. S. Pat. No. 1,980,236

Chronic arthritis where there is a sulfur deficiency (as determined by the Sullivan cystine test) may be vastly improved through the use of Sulisocol. In a notable study by Rawls and others* on 100 cases of arthritis, 67% had subnormal cystine content of the fingernails. Of these, 59.9% were improved with Sulisocol. Improvement in the focal symptoms also brought improvement in the constitutional symptoms; for example, less fatigue, improved appetite, gain in weight, mental cheerfulness.

Advantages of Sulisocol

The sulfur particles of Sulisocol remain in a state of fine dispersion and do not agglomerate. Sulisocol is readily assimilated and will replenish the loss of body sulfur, restoring normality. It is non-toxic, non-irritating, and practically painless. Being isotonic, it may be used safely intravenously as well as intramuscularly.

*Amer. Jr. of Med. Sciences, Sept. 1936, pp. 400-409.

Ultra-micro-photograph showing Brownian movement and fineness of dispersion of Sulisocol.

A course of 25 Hyposols, two injections weekly of the 2cc 20 Mgm. size is suggested.

Prepared in Hyposols (ampuls)
Box of 25

2cc 20 Mgm.	8.50
3cc 30 Mgm.	10.50

Sulisocol is the original American Injectable Colloidal Sulfur in Sterile Aqueous Clear Isotonic Solution with Characteristic Color of Sulfur. It is the only injectable colloidal sulfur for which U. S. and Foreign Patents have been granted. Sulisocol is an excellent means of supplementary arthritis therapy where you are already employing heat therapy, hot baths, diathermy, salicylates, iodides or other therapeutic measures.

Order through your druggist or supply house. If direct, cash with order.

The Drug Products Co., Inc.
26-41 Skillman Avenue
Long Island City, New York

Est. 1913

The Drug Products Co., Inc.
26-41 Skillman Avenue,
Long Island City, New York.

Gentlemen: Please send me your revised edition of "Colloidal Sulphur in Chronic Arthritis" and abstract of recent article on Sulisocol.

Dr.....

Address.....

City and State.....

Continued from page 46

The Roanoke Academy of Medicine has elected the following officers for the coming year: Dr. Fred E. Hamlin, President; Dr. J. M. Bishop, Secretary-Treasurer.

The Northern Neck Medical Society has elected the following officers for the coming year: Dr. E. R. Moorman, Kilmarnock, President; Dr. C. Y. Griffith, Mt. Holly, Dr. M. C. Oldham, Lancaster, Vice-Presidents; Dr. E. T. Ames, Montrose, Secretary-Treasurer.

The Richmond Academy of Medicine has elected the following officers for the coming year: Dr. M. Pierce Rucker, President; Dr. Karl S. Blackwell, Dr. M. M. Pinckney, Vice-Presidents; Mrs. John L. Burke, Secretary-Treasurer.

The Southside Virginia Medical Association has elected the following officers for the coming year: Dr. G. M. Naff, Emporia, President; Dr. W. A. Brumfield, Farmville, Dr. Edward Joyner, Suffolk, Dr. Fletcher Wright, Petersburg, and Dr. W. J. Ozlin, South Hill, Vice-Presidents; Dr. R. L. Raiford, Franklin, Secretary-Treasurer.

Dr. Beverley R. Tucker, Richmond, has been made President of the Association of Seaboard Air Line Railway Surgeons.

Dr. Fay A. Sinclair, Newport News, has been made President of the Tidewater Virginia Fox Hunters' Association.

Dr. Lewis M. Allen, Winchester, has been made Chairman of the Executive Committee of the Shenandoah Apple Blossom Festival.

Dr. Greer Baughman, Richmond, has been made surgeon for the Richmond Fire Department to succeed Dr. W. A. Shepherd, resigned.

Dr. Mason Romaine, Petersburg, has been made a Vice-President of the Petersburg Cooperative Concert Association.

Dr. R. Campbell Manson, Abingdon, has been made assistant to Dr. R. G. Beachley, Deputy Director of Rural Health in the State Health Department.

Dr. J. T. Duncan, Lexington, has been made Assistant Health Officer for the Allegheny-Rockbridge Health District to succeed Dr. F. N. Thompson.

Dr. B. Randolph Allen, Luray, has been made Assistant Health Officer in the Valley Health District.

Dr. Harold W. Miller, Woodstock, has been made Coroner of Shenandoah County to succeed Dr. William C. Ford, retired.

A Unique Remedy of Unique Merit

ELIXIR BROMAURATE

Is of pre-eminent therapeutic value in

Whooping Cough

- ELIXIR BROMAURATE cuts short the duration of the illness, reduces the frequency of the attacks, relieves the distressing, painful cough and gives the child rest and sleep.
- ELIXIR BROMAURATE is prescribed routinely by experienced doctors in all COUGH DISORDERS especially in SPASMODIC COUGHS, CROUPY COUGHS, PERSISTENT COUGHS and in BRONCHITIS and BRONCHIAL ASTHMA with most gratifying results.

Relieves the Cough in Pulmonary Tuberculosis

- ELIXIR BROMAURATE is a standard, assayed and palatable preparation. In four-ounce original bottles; the dosage is a teaspoonful 3 to 4 times a day after meals or more often when necessary.

DOCTOR:—We will be glad to send you a valuable booklet on "Gold in the Treatment of Whooping Cough and other Diseases". Kindly drop us a line.

GOLD PHARMACAL CO., New York

Dr. C. C. Freed, Waynesboro, has been made a Director of the Chamber of Commerce of that city.

Dr. W. M. Phipps, Hopewell, has been made a Director of the Kiwanis Club of that city.

Dr. J. M. Bishop, Roanoke, has been made a Fellow in the American Academy of Pediatrics.

Dr. Nash P. Snead, Cartersville, has been made Secretary of the Ruritan Club of Cartersville.

Dr. Porter P. Vinson, Rochester, Minnesota, has been made Professor and Head of the Department of Bronchoscopy, Esophagoscopy and Gastroscopy at the Medical College of Virginia, Richmond.

Dr. George A. Duncan, formerly of New York, New York, has moved to Norfolk.

Dr. Mark Thumim, formerly of Delaplane, has moved to Parsons, West Virginia.

Dr. Joseph M. Hitch, formerly of Cleveland, Ohio, has moved to University.

Dr. George Audney Reynolds, Bowling Green, and Miss Pearle Maupin Young were married December 31.

Dr. Paul K. Candler, Emory, and Miss Leah Estelle Haynie were married December 22.

Dr. Frederick McCulloch Morrison, Lynchburg, and Miss Gertrude Davis Hancock, were married recently.

Deaths

Dr. Benjamin H. Beydler, Bridgewater, aged 64, died October 27 from injuries received in an automobile accident.

Dr. James Allison Hodges, Richmond, aged 78, died December 15.

Dr. Benjamin Morrison Rosebro, Richmond, aged 59, died December 17 of pneumonia.

Dr. John James Nelson, Jr., Columbia, aged 48, died December 4 of heart trouble.

Dr. Morton Leonard Dudley, Roanoke, aged 52, died December 17.

WEST VIRGINIA

The Barbour-Randolph-Tucker County Medical Society has elected the following officers for the coming year: Dr. W. S. Smith, Philippi, President; Dr. A. P. Butt, Jr., Elkins, First Vice-President; Dr. S. J. Skar, Davis, Second Vice-President; Dr. Guy Michael, Belington, Secretary-Treasurer.

The Eastern Panhandle Medical Society has elected the following officers for the coming year: Dr. E. H. Bitner, Martinsburg, President; Dr. A. W. Armentrout, Martinsburg, First Vice-President; Dr. A. O. Albin, Charlestown, Second Vice-President; Dr. Edwin Cameron, Martinsburg, Secretary-Treasurer.

The Grant-Hampshire-Hardy-Mineral County Medical Society has elected the following officers for the coming year: Dr. William A. Flick, Keyser, President; Dr. E. A. Courrier, Keyser, Secretary-Treasurer.

The Kanawha Medical Society has elected the following officers for the coming year: Dr. Hugh B. Robins, Charleston, President; Dr. E. A. Vaughan, Saint Albans, Vice-President; Dr. Claude B. Smith, Charleston, Secretary-Treasurer.

The Lewis County Medical Society has elected the following officers for the coming year: Dr. Edward A. Trinkle, Weston, President; Dr. Aubrey F. Lawson, Weston, Vice-President; Dr. Theresa Snaith, Weston, Secretary-Treasurer.

The McDowell County Medical Society has elected the following officers for the coming year: Dr. R. H. Edwards, Welch, President; Dr. F. E. LaPrade, Welch, Vice-President; Dr. O. H. Fulcher, Welch, Secretary; Dr. J. K. Cooper, Premier, Treasurer.

The Monongalia County Medical Society has elected the following officers for the coming year: Dr. Cecil Ben Pride, Morgantown, President; Dr. C. F. Boyers, Morgantown, Vice-President; Dr. G. R. Maxwell, Morgantown, Secretary; Dr. L. W. Cobun, Morgantown, Treasurer.

The Parkersburg Academy of Medicine has elected the following officers for the coming year: Dr. A. R. Sidell, Williamstown, President; Dr. L. O. Rose, Parkersburg, Vice-President; Dr. B. B. Nicholson, Parkersburg, Secretary-Treasurer.

The Raleigh County Medical Society has elected the following officers for the coming year: Dr. L. G. Houser, Beckley, President; Dr. M. C. Banks, Raleigh, First Vice-President; Dr. R. W. Chambers, Amigo, Second Vice-President; Dr. L. M. Halloran, Beckley, Secretary-Treasurer.

Deaths

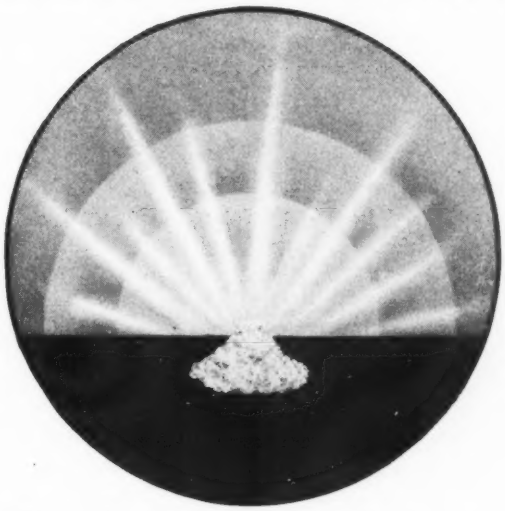
Dr. R. Coale Price, Moorefield, aged 60, died December 1 of pneumonia.

Dr. A. J. Goodwin, Wheeling, aged 46, died December 4.

Dr. A. J. Noome, Wheeling, aged 65, died December 3.

Dr. Benjamin L. Hume, Mallory, aged 62, died November 30.

No. 25 of a Series of Advertisements Prepared in the Interest of Acetanilid U. S. P. by the Emerson Drug Company



Maximum Analgesic
Effect With Minimum Dose

ACETANILID

IN SYNERGISTIC COMBINATION

ACETANILID has demonstrated its outstanding value in the relief of pain. Many physicians choose it as their No. 1 analgesic. A great number of the profession prescribe acetanilid in combination with its synergists, caffeine and bromides . . . for more rapid action . . . and for maximum effect with minimum dose.

• The relative non-toxicity of acetanilid has been frequently cited in the literature. The lower dose required when it is used with caffeine and bromides makes acetanilid doubly safe.

• Acetanilid acts to relieve pain by blocking the synapses and preventing the pain impulses from reaching the higher centres. A scientifically proportioned combination containing acetanilid with caffeine and bromides may now be had in an inexpensive, effervescent pharmaceutical. Citrates add zest and valuable alkalinization.

EMERSON DRUG COMPANY

BALTIMORE • MARYLAND

Generous trial supply and literature sent upon request

How Much Sun Does the Infant Really Get?

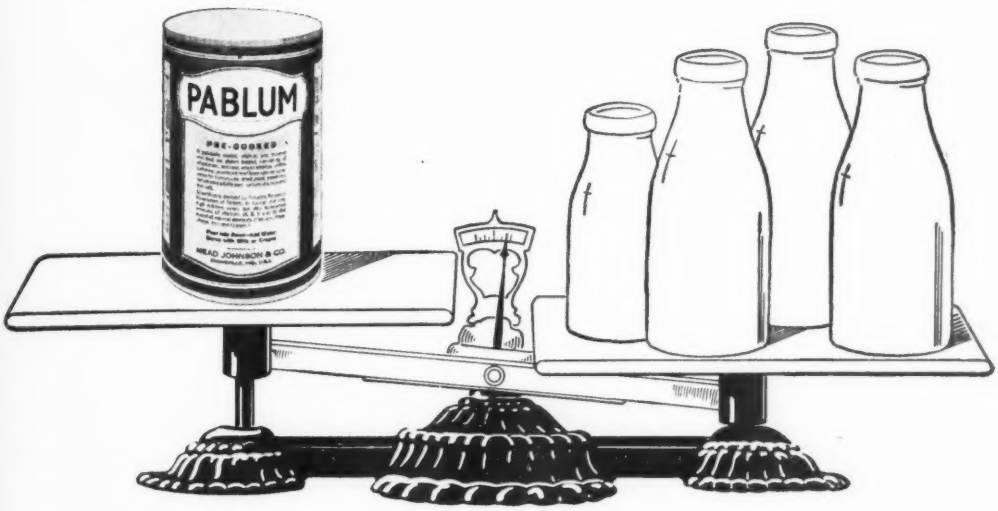
Not very much: (1) When the baby is bundled to protect against weather or (2) when shaded to protect against glare or (3) when the sun does not shine for days at a time. Oleum Percomorphum offers protection against rickets 365¼ days in the year, in measurable potency and in controllable dosage. ***Use the sun, too.***

Oleum Percomorphum Price Substantially Reduced Sept. 1, 1936!

We are hopeful that by the medical profession's continued whole-hearted acceptance of Oleum Percomorphum, liquid and capsules (also Mead's Cod Liver Oil Fortified With Percomorph Liver Oil), it will be possible for us to make the patient's "vitamin nickel" (A and D) stretch still further.

Mead Johnson & Company, Evansville, Indiana, U. S. A., does not advertise any of its products to the public.

PABLUM Absorbs 7 Times Its Weight in MILK!



RICH IN IRON AND VITAMIN B, PABLUM COMPLEMENTS MILK

PABLUM is a distinct aid in the ever-present problem of persuading children to take more milk. So porous is Pablum that when mixed to the consistency of ordinary hot cooked cereals it holds 7 times its weight in milk—before being served with added milk and sugar. Pablum is not only an excellent carrier for the high food values which make milk indispensable in the child's diet, but in addition Pablum complements milk. The latter, although regarded as a nearly perfect food, is recognized as being deficient in iron and in vitamin B, both highly essential to the growing child. These deficiencies are corrected when milk is combined with Pablum, the latter furnishing 8½ mg. iron per ounce and an important amount of vitamin B. An average portion of Pablum (1 ounce) as served at the table with milk and sugar offers unusually high nutritional values, namely:

Ca	P	Fe	Vitamins A, B, G	Protein	Fat	Carbohydrates	Calories
.53 gm.	.41 gm.	9 mg.	+ + +	13 gm.	10 gm.	39 gm.	295

The calcium and iron — minerals often deficient in the child's diet — generously aid in meeting the daily requirements. Substantial amounts of phosphorus and vitamins B and G are also furnished. In addition, there is a large measure of protein, fat, carbohydrates, and calories. That Pablum is "more than a breakfast dish" is being recognized by physicians who use it not only in infant and child feeding but also recommend Pablum to adults.

Pablum consists of wheatmeal, oatmeal, cornmeal, wheat embryo, brewers' yeast, alfalfa leaf, beef bone, iron salt, and sodium chloride.

MEAD JOHNSON & COMPANY, Evansville, Indiana, U. S. A.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons.

"A supply in the bag; a supply in the office *—always!"*

No physician knows, when he starts his day, what critical situations will confront him. Because this product is essentially an emergency remedy, many physicians make a practice of keeping at hand at all times a supply of Adrenalin Chloride Solution 1:1000 (the Parke-Davis brand of Solution of Epinephrine Hydrochloride U.S.P.).

Medical men and women throughout the world have been relying on the original Parke-Davis product every hour of the day and night for thirty-five years; and the resources and personnel of the Parke, Davis & Co. laboratories of today are pledged to maintain its unvarying dependability. A request will bring the booklet "Adrenalin in Medicine" by return mail.

PARKE *DAVIS*

& COMPANY

Home Offices and Laboratories — Detroit, Michigan

ATLANTA BALTIMORE BOSTON BUFFALO CHICAGO CINCINNATI DALLAS INDIANAPOLIS
KANSAS CITY MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH
ST. LOUIS SAN FRANCISCO SEATTLE